FOOD MANUFACTURE

Incorporating Food Industries Weekly

A PUBLICATION OF THE LEONARD HILL TECHNICAL GROUP JUNE 1, 1959

CLARK'S CARAMEL

is consistent and consistently the best!

A colour of natural origin permitted in foodstuffs in all countries.
Made under the strictest laboratory control.
Consistent in tinctorial values—consistent in properties.

Made in a variety of Grades, for every use of which the following are examples:

48,000	For gravy browning, gravy salt, malt vinegar, non-brewed table condiment, clear canned soups.
Manufacturing (56,00)	Pickles, sauces, mincemeat.
Bakery	Brown bread, cakes.
Biscuit	Biscuits (all types).
SD	Soft drinks.
WB	Cider, wines, cider vinegar, wine vinegar, liqueurs, flavouring essences.
Spirits	Spirits.
'Caramelene'	Caramel desserts, cakes, fillings, icings, fondants, ice-cream (imparts the old-fashioned true 'burnt sugar' flavour).

Clark's Caramel, Sugars, and Syrups—made specially for the Food, Sugar Confectionery, and Bakery Trades—are distributed by the Industrial Products Division of Brown & Polson Ltd.

Write for Literature and Testing Samples to:

Brown & Polson Ltd

INDUSTRIAL PRODUCTS DIVISION

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Department of Food Technology University of Massachusetts Amherst, Massachusetts

NEATASEAL

Brit. Pat. 792,086

The new foil diaphragm for slip lid tins

CHEAP!

QUICK!

CLEAN!

Illustrated is the export container for Farley's Rusks

No other diaphragm is as cheap for the packer to apply as Neataseal. And because no flux or solder is needed, there's no risk of contamination to food or pharmaceuticals. In one swift operation the Neataseal foil diaphragm is automatically heat sealed to the whole rim of the tin. That's what makes Neataseal quicker and cleaner than soldering by hand.

As airtight as a hand soldered tagger, completely hygienic and tamper proof, Neataseal can be fitted to any size or shape of slip lid container as long as the body has the correct contour of top curl. To add exciting seasonal and sales appeal to your packaging, a Neataseal diaphragm can be repeat decorated in any number of attractive colours. Write for more information today.

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The Universal K.S

★ *the one and only— often imitated but unsurpassed* ★

for meat paste, fish paste, chicken paste, confectionery, fruit squash, tomato sauce, mayonnaise, vegetable purée.

All are happy with this wonderful machine, which enhances the natural binding power of all meat, and ensures no separation of fat, all in a matter of seconds.

Chopping and mincing have been eliminated. There is now no need to spend laborious hours de-rinding. The K.S. is a most economical machine. And what a time-saver!

It is simplicity itself to operate, easy to clean and needs only the minimum of maintenance.

Please write or 'phone for demonstration.

Australian user reports

Since we installed the Foodtech K.S. all our products have achieved a uniformity previously impossible with the usual mincers. Sales have gone up considerably thanks to this most economical machine and the high quality of its product.

U.K. user reports

Since K.S. machines have been incorporated in our production lines, skinless sausages have improved considerably in colour, and peeling is much easier. Pork sausages show excellent colour and binding, and luncheon meat and pies show improved texture and colour. These are undoubtedly the most profitable machines in our factory.

German user reports

I installed a K.S. in 1955 and have now four of these machines in operation. I cut out mincers altogether. The K.S. gave all my products uniformity, high binding power and texture. I am an extremely satisfied customer and I can recommend this machine to all my colleagues for economy and speed.

U.S.A. user reports

The K.S. Mincemaster gives a uniform proportion of meat to fat throughout every mix. It enables you to aim at, say, a 30% fat content and get it every time. There is no question of varying between 26% and 34% from batch to batch. This invariable high quality promotes sales confidence in the product and ensures better sales results.

For full details write to: **Foodtech Ltd.** **Queen Anne's Place, Bush Hill Park, Enfield, Middlesex. Telephone: LABurnum 6656/7**

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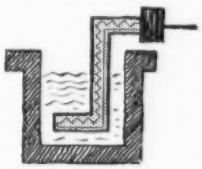
Resistance Heating – 2

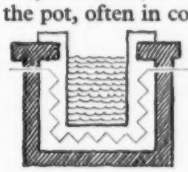
Electric resistance heating elements have been briefly described in Data Sheet No. 4, with two examples of their application in industry. This sheet lists some of the further applications which can be effectively dealt with by resistance heating.

Soft Metal Melting

Electric resistance melting is most commonly used for lead, tin, zinc, antimony, aluminium and their alloys—in processes such as tinning, type-casting, die-casting and lining bearings—at temperatures of up to around 800°C.



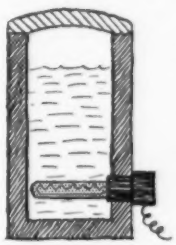
In most cases, sheathed elements are immersed directly in the metal, a more efficient method than applying heat to the outside of the containing vessel or pot. Immersion heating simplifies the application of lagging to the outside of the vessel, reducing heat losses and current consumption to a minimum. The elements are usually positioned near the inside wall of the vessel, leaving plenty of working space, but in a few cases, where the full volume of the pot is required, or where the metal to be melted is particularly corrosive, the elements are positioned outside the pot, often in contact with it.



In all cases, the precise temperature control that is so essential in soft metal processes is readily achieved by the use of electricity, and electric heating also leads to a reduction of casting rejects and metal wastage and a marked improvement in working conditions.

Liquid Heating

Electricity provides the ideal way of heating liquids such as water, oils, varnishes, plating, photographic and other solutions, and of melting and heating waxes and compounds, glues and pastes, tars and bitumen. Again, immersion heating is the method most commonly employed, but considerations of space or the nature of the liquid may sometimes necessitate the use of external heaters. Several types of devices are available to give precise and automatic temperature control, and lagging is again commonly applied to the vessel to minimise heat losses.

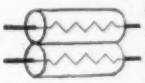


Fire hazards associated with inflammable liquids are invariably reduced by electric heating, particularly if immersion heaters can be used.

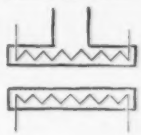
It is usually possible without difficulty to apply electric heaters, either immersion or external, to existing vessels.

Platen, Press and Roll Heating

Electricity offers the simplest and most convenient method of heating platens, dies and rolls. It gives the precise temperature-control characteristic of electric heating systems, with lower maintenance costs. Moreover, the relatively high temperatures required in some processes for maximum working speeds are reached without difficulty. Flexible electrical connections to moving parts give far less trouble than flexible pipe connections carrying hot water or steam.

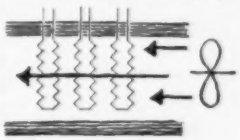


When electric heating is used, one or more presses can be operated without the necessity of keeping a boilerhouse staff at work.



Air Heating

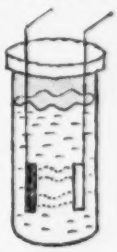
Streams of air, and of many other gases, can be heated most efficiently by electric resistance elements disposed across the duct leading to or from a fan. Heat is generated only inside the duct, just where it is required, and none is carried away through exhaust flues or pipes. Quick rise of temperature and precise temperature control are assured when electric resistance air heaters are used.



Electric Steam Boilers and Steam Raising

When steam is essential to a process, electrical steam raising can often be fully justified on economic grounds.

The means employed for bringing steam from a boilerhouse to the point of usage are often extremely wasteful, but where electricity is used the steam can be generated on the spot and losses from steam mains are eliminated. The efficiency of the electric boiler normally exceeds 96% and is practically constant at all loads, while the rapidity with which steam can be raised very largely eliminates banking losses.



Plant requiring process steam can be equipped with its own electric steam boiler, freeing the working space of steam mains just as individual electric motor drives free the factory of masses of shafting and belt drives.

Even where boilerhouse steam is still used, it is sometimes desirable for best results to boost the steam temperatures at the point of usage, to make up for transmission heat losses or to increase the superheat, and this function can most conveniently be performed by an electric resistance heater inserted in the steam line.

For further information get in touch with your Electricity Board or write direct to the Electrical Development Association, 2 Savoy Hill, W.C.2. Telephone: TEMple Bar 9434.

Excellent reference books on electricity and productivity (8/6 each, or 9/- post free) are available – "Resistance Heating" is an example; "Induction and Dielectric Heating" is another.

E.D.A. also have available on free loan a series of films on the industrial use of electricity. Ask for a catalogue.

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"Mechanised Muscle" embraces the finest range of handling equipment in the world. Reach Trucks, Fork Trucks, Pallet and Stillage Trucks, Tractors and Trailers of all capacities and purposes. ***Write for full details to: Dept 12***

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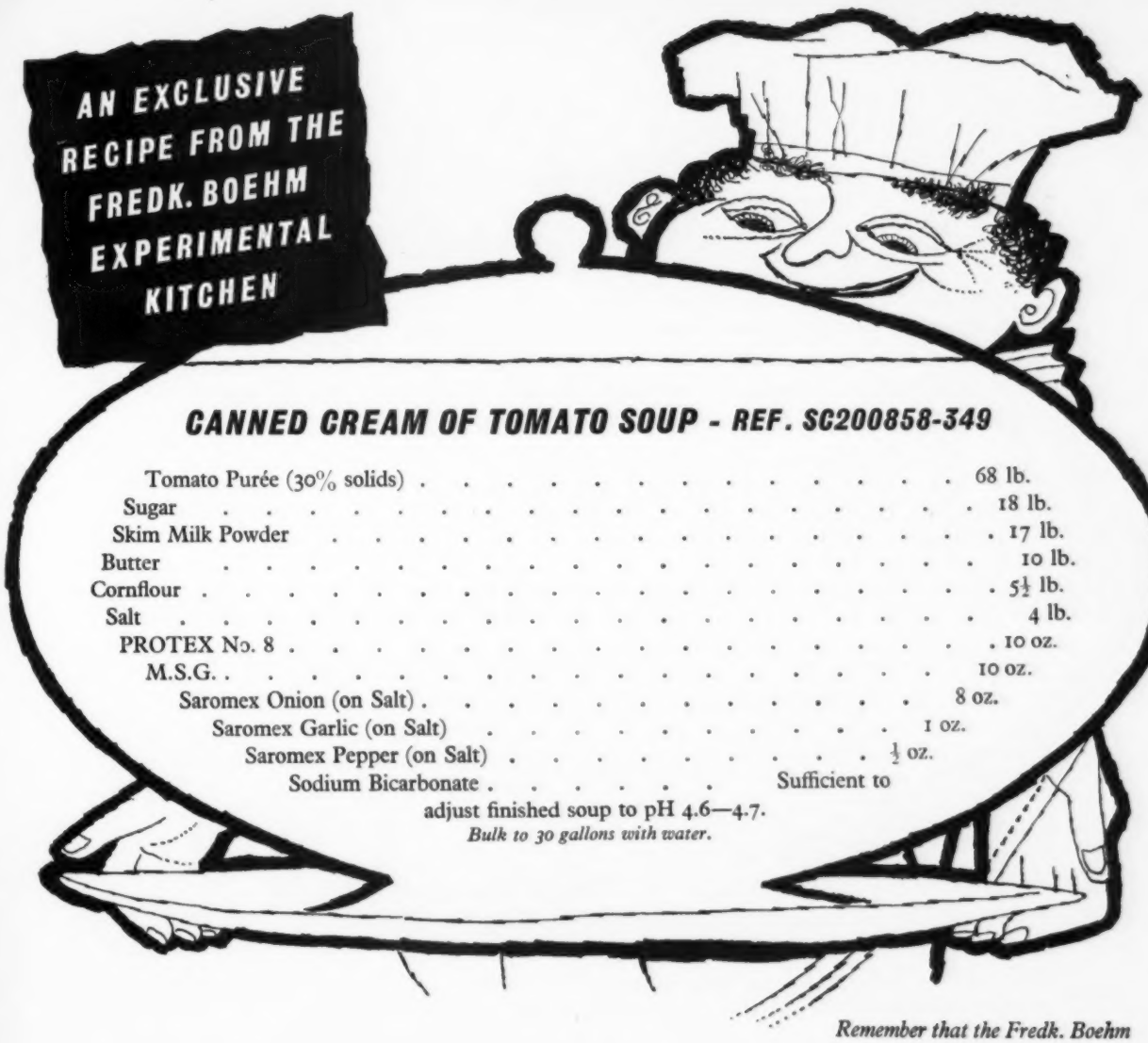
AN EXCLUSIVE RECIPE FROM THE FREDK. BOEHM EXPERIMENTAL KITCHEN



CANNED CREAM OF TOMATO SOUP - REF. SC200858-349

Tomato Purée (30% solids)	68 lb.
Sugar	18 lb.
Skim Milk Powder	17 lb.
Butter	10 lb.
Cornflour	5½ lb.
Salt	4 lb.
PROTEX No. 8	10 oz.
M.S.G.	10 oz.
Saromex Onion (on Salt)	8 oz.
Saromex Garlic (on Salt)	1 oz.
Saromex Pepper (on Salt)	½ oz.
Sodium Bicarbonate	Sufficient to adjust finished soup to pH 4.6—4.7.

Bulk to 30 gallons with water.

Bulk to volume and whisk vigorously in stainless steel steam-heated pan, fitted with a stirrer. Bring to the boil and simmer for 5 minutes. Homogenize at 1,500—2,000 p.s.i. and 180°F. and fill into plain No. 1 Tall cans at 200°F. Seal and process at 225°F. for 1¼ hours and water cool. The pH of the processed soup should be 4.6—4.7.

Remember that the Fredk. Boehm Experimental Kitchen exists to help you. Perhaps you have a recipe of your own which is proving to be a problem; or perhaps you want a recipe prepared for you by experts. That is where our unrivalled experience can help you. Write to us at the address below. The service by the way is FREE.

Fredk. Boehm Ltd.

FREDK. BOEHM LTD., 19 BENTINCK STREET, W.1.
TELEPHONE: WELbeck 7933

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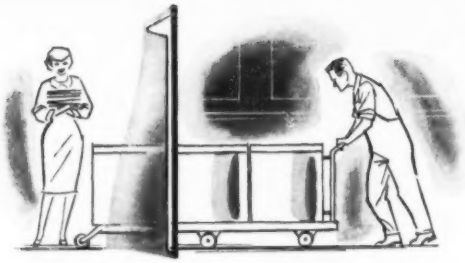
(Hydrolised Protein)

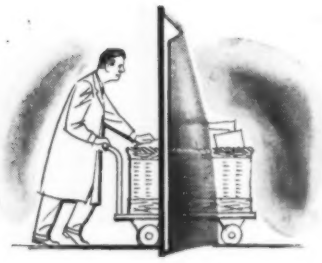
YEATEX
(Autolysed Yeast Extract)

AJINOMOTO
(Monosodium Glutamate. 99% Pure)

the safe



Safe because it is translucent, hygienic, allows easy passage for speedy handling of goods between departments where constant usage is necessary.



flexible

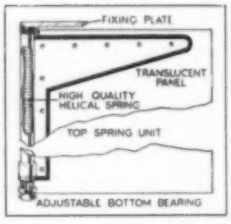
Flexible to allow wide manually operated trolleys to be used.

self-closing

door

Self-closing so that it cuts down draughts and noise.

The framework of the door consists of a vertical tube which fits close to the door frame. Concealed in the top of the tube is the patented double-action return spring, this is fully adjustable and ensures that the door is self-closing. The door pivots at the top and bottom on axles let into the lintel and into the floor.



NEWAY

Translucent Doors

★

See Neway Flexible Doors at the Building Centre, 26, Store St., London, W.C.1, or write for free leaflet to the Manufacturers.

WILLIAM NEWMAN & SONS LTD. (Dept. FM) HOSPITAL ST., BIRMINGHAM 19.

A desirable

Safe and

Uniform

YELLOW

BETA CAROTENE 'ROCHE'

for colouring foods *Safely*

Highest standard of purity and uniformity with full biological activity. Available in forms convenient and easy to use for colouring:

- Margarine, shortening and liquid cooking oils
- Processed cheese
- Macaroni, Noodle and Spaghetti products
- Cake Mixes and Biscuits

Prices and technical information from

ROCHE PRODUCTS LIMITED · 15 MANCHESTER SQUARE · LONDON · W.1

Telephone: Welbeck 5566

Versatility

BEER IN CANS... another new use for tinplate

Tinplate is changing the traditionally conservative habits of beer-drinkers. Already in Britain no fewer than nineteen leading brewers are packing thirty-four brands of beer in cans.

Research and development by The Steel Company of Wales have helped to make possible this further example of tinplate's increasing versatility. In addition to the special type of tinplate required for canning beer, The Steel Company of Wales produces a wide variety of grades and qualities to suit many specialized applications.

Satisfying more than two-thirds of Britain's needs has taught us a great deal about tinplate. Why not write to us? There are several interesting developments you may not know about.

TINPLATE DIVISION

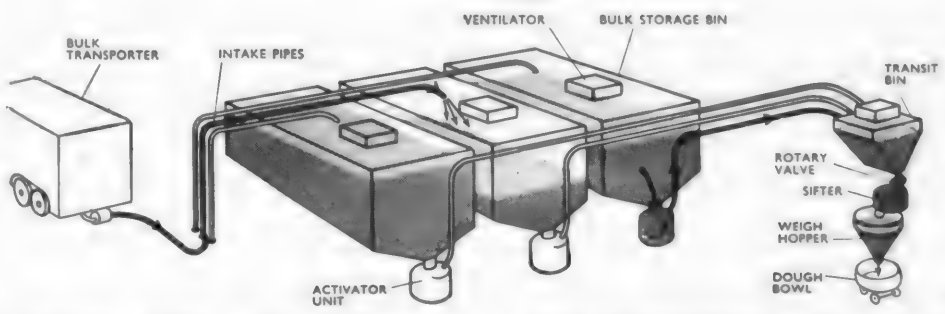
THE STEEL COMPANY OF WALES LIMITED

Carmarthen Road, Swansea, Glamorganshire Telephone: Swansea 51571 Telegrams: Welshplate, Swansea

The Proved *bulk flour handling system*

The BLAW KNOX "Auto-AIRFLOW" Bulk Flour System offers storage and handling facilities for large and small bakeries and flour mills. Simple and flexible design brings low capital and installation costs... low power requirements afford operating economy... maintenance costs are minimized and reliability is assured as no mechanical wearing parts operate in contact with flour. **"Auto-AIRFLOW"** plants are supplied with automatic or semi-automatic control and facilities for pneumatic blending by weight can be incorporated. Flour level in the transit bin is maintained automatically to assure constant supply of blended flour to the weigher. Bins are of heavy gauge steel plate, the exterior finished in ivory enamel or to customers requirements. Smooth interiors, coated with epoxy resin paint, are free from ledges, crevices and mechanical obstructions. Aeration pads in the base of bins assure complete discharge of flour, eliminating risk of infestation.

BLAW KNOX *Auto-AIRFLOW*

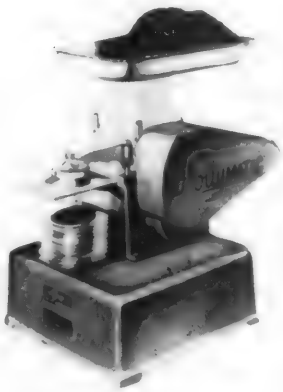


Flexible design
Automatic
Reliable
Hygienic
Economical

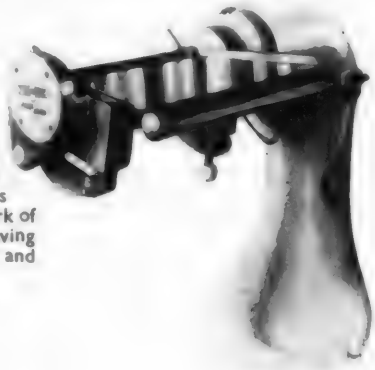
BLAW KNOX LIMITED (Box No. 112) 90/94 BROMPTON ROAD LONDON S.W.3 BK 559.

DO IT BETTER, FASTER
and at LESS COST with
STOKES & DALTON'S
MEAT PROCESSING MACHINERY

Meet the challenge of competition by faster, better processing. Designed for ease of operation and simple maintenance, these modern machines can play an important role in the development of YOUR products. Ask for demonstration.

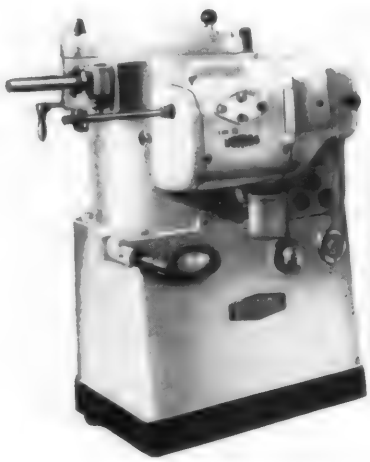


Hollymatic Patty Making Machine. This amazing new machine will produce up to 2,100 patties or hamburgers an hour, stacking them automatically on paper.



Townsend Derinder. Simple to operate and of uncomplicated design. Makes short swift work of any cut, removing rind smoothly and evenly.

THEY MEAN BUSINESS these STOKES & DALTON products



Vemag Filler and Linker. Operates with speed and astonishing accuracy for indefinite lengths of time. Output 2 to 16 identical links per lb. of any desired size.

The Seydelmann Super Cutter handles large and small pieces of frozen, chilled or soft meat and gives an excellent and consistent chop in the minimum time.

STOKES & DALTON LTD
Victoria Spice Mills, Leeds, 9

TELEPHONE: LEEDS 31701 (10 Lines) *TELEGRAMS: NUKRISKO LEEDS*

150

This paint kills insect pests

LAKIL

INSECTICIDAL PAINT

kills flies, bluebottles, ants, woodworm, cockroaches etc.

No flies on Lakil—literally! Lakil is the *only* paint which carries its own powerful insecticides. Completely harmless to all animals—including man—Lakil is death to flies, bluebottles, mosquitoes, ants, gnats, cockroaches, silver fish, moths, weevils, termites, wasps, grainborers and woodworm etc. Lakil, in fact, not only decorates your premises, *but* keeps them entirely pest free. Lakil can be applied by brush, roller or spray and retains its insecticidal properties for at least two years. Washing down not only keeps it fresh but re-activates its pest-killing properties.

Lakil for protection from all insect pests in Homes, Kitchens, Dairies, Farms, Hospitals, Factories, Warehouses, Ships, Breweries, Canteens, Bakeries, etc.

Lakil comes in two varieties: CLEAR, which is similar to a transparent varnish—or PIGMENTED, in a choice of delightful shades.

Send for shade card, leaflet and full details

LAKIL INSECTICIDAL PAINT

J. MANGER & SON LIMITED, KINGSLAND, LONDON, E.8

An Amasol *Company*

J. MANGER & SON LIMITED, Dept. LAK 5
KINGSLAND, LONDON, E.8

Please send Shade Card, Leaflet and full details

NAME.....

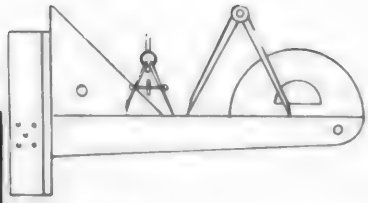
COMPANY.....

ADDRESS.....

.....

.....

Photo by courtesy of Scribbans-Kemp Ltd.



PLANNED DESIGN

—Worth looking into if you plan to handle and store ingredients in bulk

Tailor-made to your requirements | Tried and tested under various conditions at home and overseas | Perfect hygiene | Automatic control | Complete flexibility in conveying | Economies of labour and effort | These are the advantages of **PLANNED DESIGN**, *the Baker Perkins system of pneumatic bulk handling and storage |*

Among

PLANNED DESIGN

features are:—

* Specially-protected steel storage bins manufactured to the strictest possible standards of hygiene.
* Elimination of infestation-carrying ledges.
* Pneumatic system throughout: no infestation dangers from mechanical dischargers or conveyors.
* Weighing with pneumatic feed that gives flexibility of layout and simplicity of control.
* Precise weighing of flour, sugar and similar ingredients Patented electro-magnetic piston valve gives instant and automatic closure, accurate weigh-off.
* Pneumatic blending.
* Automatic 'topping up' device which ensures that service bins are immediately filled with correct blend.
* Feeding equipment designed to suit individual mixing processes and backed by Baker Perkins' long experience of mixing machines.

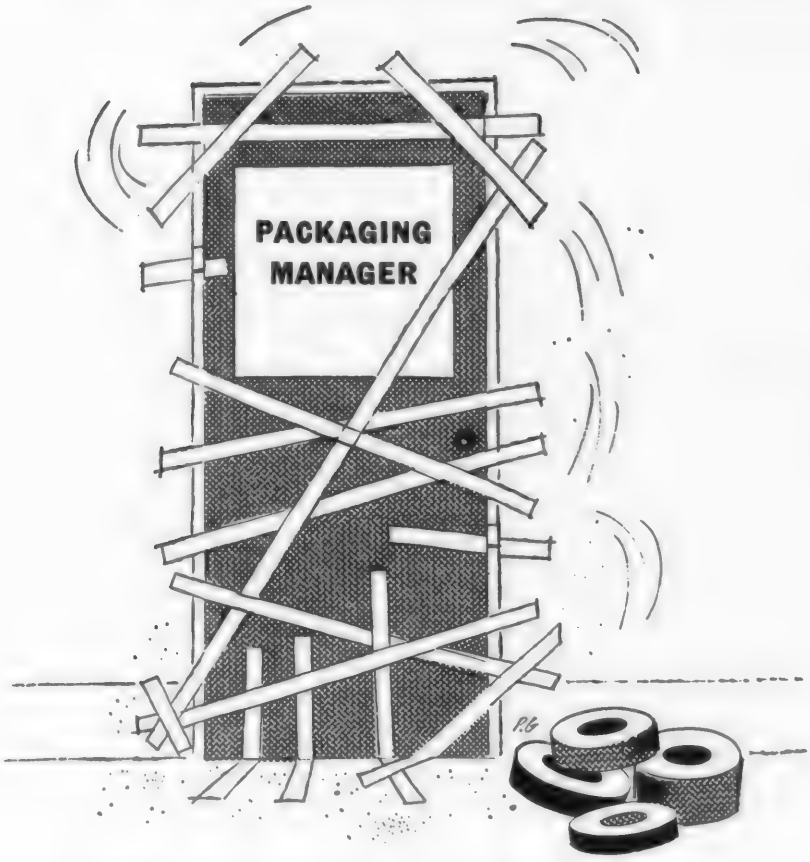
These and many other special features of

PLANNED DESIGN

pneumatic installations are supported by Baker Perkins' comprehensive service organisation.

BAKER PERKINS LTD
Engineers
WESTWOOD WORKS · PETERBOROUGH

BP 105



The Packaging Manager is crazy about

LASSO No. 76 Vinyl Tape

The man is like a gramophone. Trouble is he only has one record and he won't run down. Never stops talking about Lasso No. 76 Vinyl Tape. "Amazing pliability," he says... "Waterproof and moisture-vapour proof," he says . . . "Pressure sensitive adhesive tape with exceptionally long storage life," he says, he says, he says, he says...

SEALING MACHINES DEMONSTRATED The Lassotape Machinery Service offers a complete range of sealing machines—from hand operated dispensers to automatic machines. If you would like to see these efficient sealers and have the advice of a package sealing expert, write, without obligation, for our travelling demonstration unit to visit you.

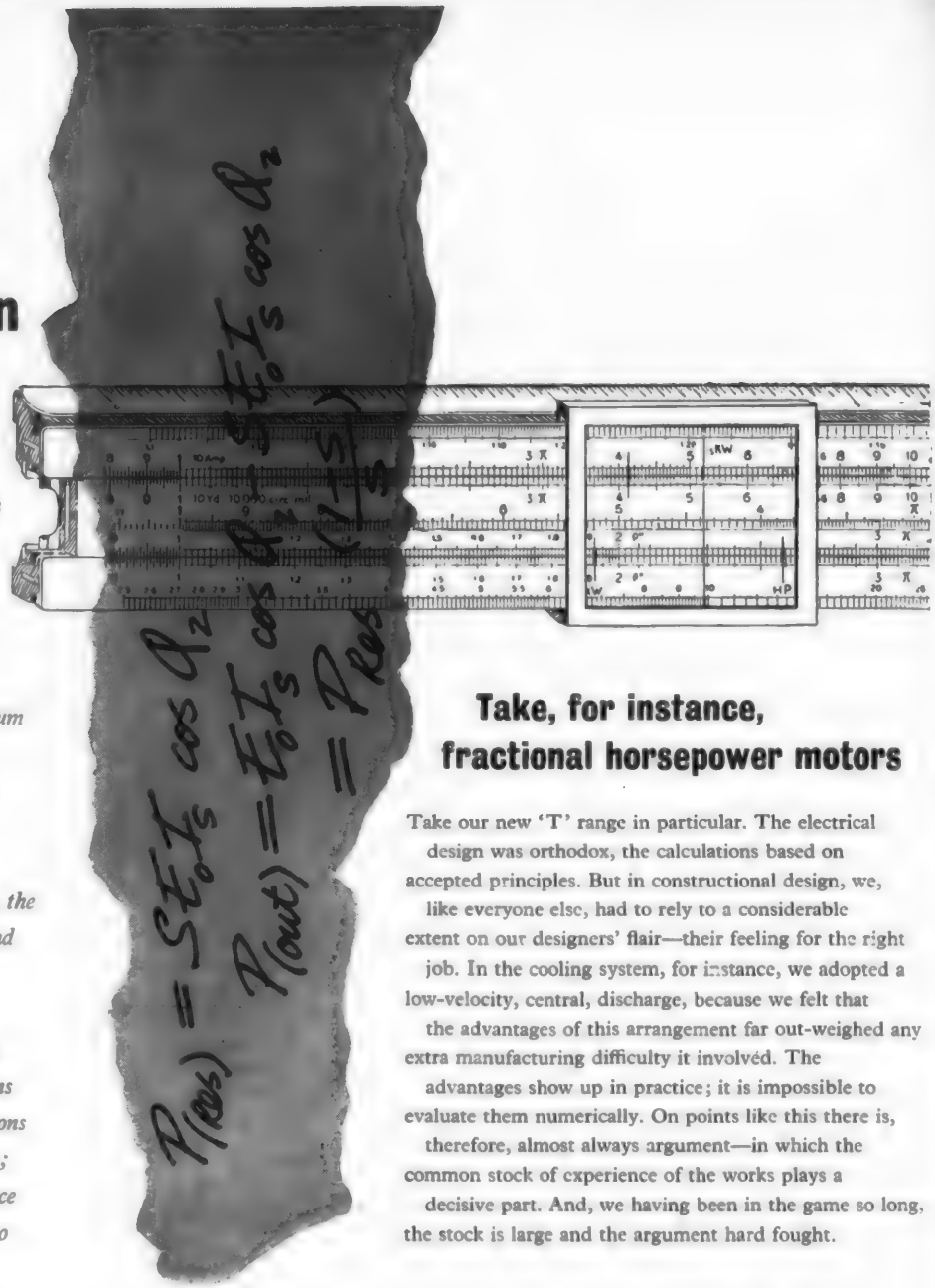
For further information on Lasso No. 76 Vinyl Tape and other Lassotapes for the packaging industry, write to the address below.

LASSOTAPES

FOR ALL PACKAGING AND INDUSTRIAL USES

S&N SMITH & NEPHEW LIMITED • WELWYN GARDEN CITY • HERTS

It takes more than a slide rule and data...



The first steps in design are usually mathematical; the determination say, of the optimum of active material required for a given performance. Here the designer depends on his knowledge of the most recent work on electromagnetic theory, the potentiality of new materials and new techniques. Every designer must keep abreast of such developments. But as the design proceeds he has to make decisions of a different kind. These decisions will depend on direct experience; on knowledge obtained in practice and too complex to be reduced to a set of equations. This plays a vital part in design.

Take, for instance, fractional horsepower motors

Take our new 'T' range in particular. The electrical design was orthodox, the calculations based on accepted principles. But in constructional design, we, like everyone else, had to rely to a considerable extent on our designers' flair—their feeling for the right job. In the cooling system, for instance, we adopted a low-velocity, central, discharge, because we felt that the advantages of this arrangement far out-weighed any extra manufacturing difficulty it involved. The advantages show up in practice; it is impossible to evaluate them numerically. On points like this there is, therefore, almost always argument—in which the common stock of experience of the works plays a decisive part. And, we having been in the game so long, the stock is large and the argument hard fought.

Crompton Parkinson LIMITED

Member of ATOMIC POWER CONSTRUCTIONS LTD.

One of the five British nuclear energy groups

MAKERS OF ELECTRIC MOTORS OF ALL KINDS. ALTERNATORS AND GENERATORS. SWITCHGEAR. B.E.T. TRANSFORMERS. CABLES. INSTRUMENTS. CEILING FANS. LAMPS. LIGHTING EQUIPMENT. BATTERIES. STUD WELDING EQUIPMENT. TRACTION EQUIPMENT.

CROMPTON PARKINSON, LTD., CROMPTON HOUSE, ALDWYCH, LONDON, W.C.2.

The Packaging Manager is crazy about

LASSO No. 76 Vinyl Tape

"Lasso No. 76 Vinyl Tape"—that's all they ever hear from him. They asked him to stop, but he can't. The man's obsessed with the stuff. "Amazing pliability," he said . . . "Waterproof and moisture-vapour proof," he droned . . . "Pressure sensitive adhesive tape with exceptionally long *storage* life." *That* put the lid on it!

SEALING MACHINES DEMONSTRATED The Lassotape Machinery Service offers a complete range of sealing machines—from hand operated dispensers to automatic machines. If you would like to see these efficient sealers and have the advice of a package sealing expert, write, without obligation, for our travelling demonstration unit to visit you.

For further information on Lasso No. 76 Vinyl Tape and other Lassotapes for the packaging industry, write to the address below.

LASSOTAPES

FOR ALL PACKAGING AND INDUSTRIAL USES

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Chicken Meat
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of unsurpassed quality

Telephone: Mansion House 5106 & 4271

Telex: 23873

Cables: Bucephalos London

OF SPECIAL INTEREST
TO PACKERS OF
FRUIT, VEGETABLES,
MEAT PIES & SAUSAGES
(300 Q.S.A.T.)

The packaging film that 'breathes'
When apples, tomatoes and similar products and meat pies and sausages are packed, it is of the greatest importance that they should 'breathe'. This new film, while heat-sealable, is highly permeable and will keep these products in perfect condition.

Visit our display at the
PACKAGING CENTRE

BRITISH SIDAC LTD . ST. HELENS, LANCS • *St. Helens 4041*
LONDON SALES OFFICE: Brewery Rd., N7. *North 5791* SCOTTISH SALES OFFICE: 36 Elmbank Cres., Glasgow C2. *City 5620*

QUALITY in White Flint GLASS CONTAINERS

First Class in **GLASS**

NATIONAL GLASS WORKS (YORK) LTD.
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ALSO AT: CAROLINE HOUSE 55-57 HIGH HOLBORN, LONDON, W.C.1. Tel. HOLBORN 2146

★ Packed in easily handled cartons

PROMPT DELIVERY FROM STOCK

TRADE N MARK

P&S FLAVOURS *are much better!*

RASPBERRY
"BREDA"

A fortified flavour based on the natural fruit. Specially prepared for High Boilings.

20/- per lb. delivered
Dosage: 2 ozs. per cwt.

One of the fine range of Raspberry flavours with the modern trend towards the natural fruit characteristics.

ALSO FOR CENTRE WORK
we recommend
RASPBERRY N.2F

37/6 per lb. delivered
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50, Great Cambridge Road, Enfield, Middlesex.
Telephone: ENFIELD 6781/2/3/4

hygiene at HEINZ

Extraordinary precautions are taken to ensure cleanliness in the Heinz food factory at Harlesden, so naturally enough there are GRILL FLOORS around the pressure vessels which cook some of their products. GRILL FLOOR flooring does not harbour dirt and is easily cleaned, two important considerations in an industry where hygienic conditions are essential.

CEMENT WORKS
MATERIALS HANDLING PLANT
AIRCRAFT INDUSTRY
COAL WASHERIES
POWER STATIONS
OIL REFINERIES
GAS WORKS
CHEMICAL PLANTS
WATER WORKS
FOOD PREPARATION PLANTS
ETC., ETC.

GRILL FLOOR flooring surrounding pressure vessels at Heinz, Harlesden factory, London.

GRILL walkways

GRILL FLOORS LTD LONDON W.10

TELEPHONE: LADBROKE 3066-7 (2 LINES) *TELEGRAMS: ETYLADEC WESPHONE LONDON*

F789

When you launch
your product on the seas of trade,
show its colour and quality from the security of a
Key glass container. Containers and closures
specially designed by Key Glassworks Ltd. are the vessels
in which your wares will voyage safely and successfully.
Key Glassworks Ltd Factories at New Cross · Alperton · Harlow
First Class in GLASS
Please address all correspondence to Ronald Gale and Co. Ltd · 7 Fursecroft · George Street · London W1

Stepless speed variation over a 9 to 1 output speed range (1/3 to 3 times the input speed).

Constant horse-power transmitted throughout the speed range.

Flange mounted motors (when required) giving output speeds from 320 to 2880 r.p.m. and from 480 to 4320 r.p.m.

Output speeds down to 3 to 27 r.p.m. or lower can be obtained with flange mounted Reduction Gears.

Exceptionally light, sensitive and accurate control of speed settings by lever or handwheel with counter type indicator incorporated if required.

Co-axial input and output shafts which rotate in the same direction.

Service reliability resulting from a simple design manufactured to high precision limits.

Compactness, with consequent ease of mounting as an integral part of a machine.

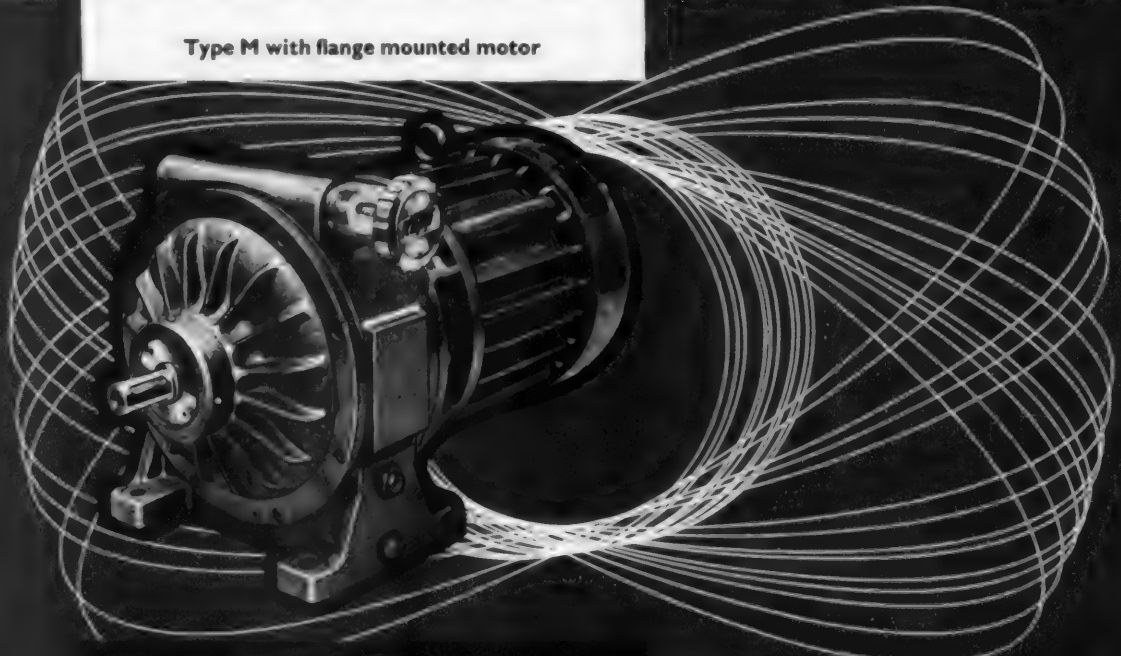
Vibrationless and silent performance.

Standard range 1/33 h.p. to 15 h.p.

PLEASE ASK FOR ONE OF OUR DEMONSTRATION VANS TO CALL AT YOUR WORKS

A GEARLESS GEARBOX

Type M with flange mounted motor



Kopp

VARIABLE SPEED GEARS

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TELEPHONE: ACORN 7150

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TELEPHONE: 3-1146, 3-0285 6

ALLSPEEDS LIMITED
OAKENSHORE WORKS, CLAYTON-LE-MOORS, ACCRINGTON, LANCASHIRE
TELEPHONE: ACCRINGTON 5441 (4 LINES)

Bottles sta

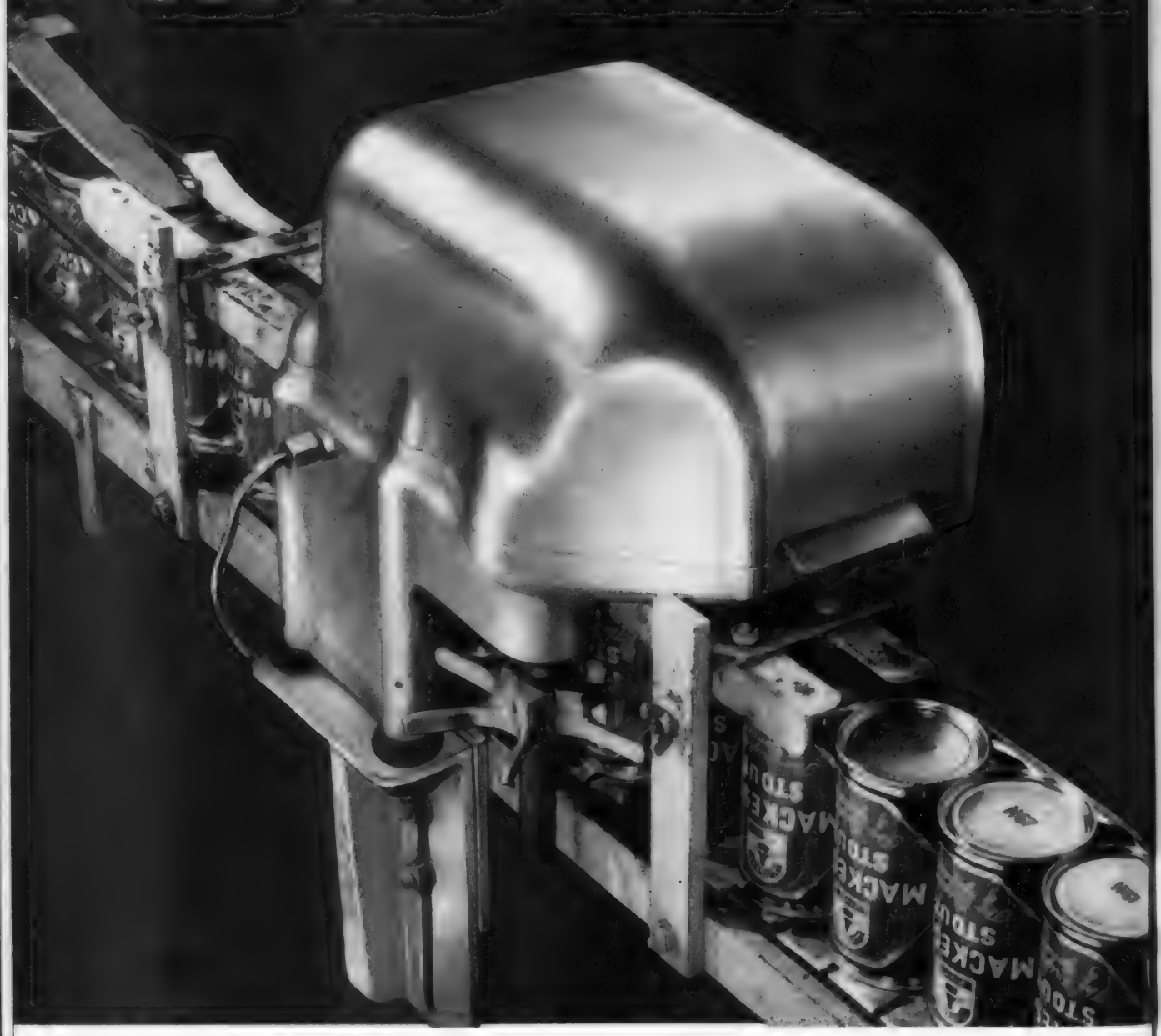
My dear, you'd never *dream* what trouble I've had with Roderick lately. He's had bottles on the brain. No, dear, *brain* — not train. One night he sat bolt upright in bed and chanted (positively chanted):— *Bottles stand on their caps.* Just like that. Then a lot of rigmarole about juice all over his factory floor. Sticky situation. Send for Production Manager. Send for Foreman. My dear, I was nearly sending for a Harley Street headshrinker. by that time. Oh, he's all right now. Something called United Glass. No, not a wonder-drug, darling. They make both bottles *and* caps. Closures, Roderick calls them. *Closures*, not roses, dear. Roderick says the cap always fits when you buy bottles from United Glass. And as I say to Roderick, if the cap fits, wear it . . .

United Glass is the only British maker of bottles with its own closure division. And it's the only company with as many as eight bottle factories. They supply bottles to thousands of customers for a wide range of products. The Glass Packaging Advisory Bureau, set up by United Glass, will be glad to advise you on all your glass packaging problems. Please get in touch.

UNITED GLASS

United Glass Ltd., 8 Leicester Street, London, W.C.2. *Tel:* GERrard 8611. *Telegrams:* Glaspak, Lesquare, London.

500 clear marks a minute



The B-W BRUCEWAY Can Marker

THE BRUCEWAY can marker marks up to 500 cans a minute with a clear, clean, legible stamp. Marks any type of straight-sided cylindrical can up to 3¾" diameter on either end. Side rail twists are available for efficient reversing so that either top or bottom can be marked. The BRUCEWAY needs no power — effects a substantial saving in running costs.

BARRY BW WEHMILLER

BARRY-WEHMILLER MACHINERY CO. LTD., WINGATE HOUSE, 93-107 SHAFTESBURY AVENUE, LONDON, W.1
Telephone: Gerrard 6216 (5 Lines) Telegrams: Barrywek Wesphone London Cables. Barrywek London

fabrication of . . .

tanks, high and low pressure vessels, vacuum receivers, distillation plants, agitators, heat exchangers, mobile vessels and tankers, cone blenders, boiling pans, hoppers, etc.

Standard 500 gallon F.M.B. quality vertical storage tank.

in . . .

Stainless Steel, "Monel" Metal, Nickel, and Mild Steel.

to . . .

Manufacturing codes including Lloyds, Asme, BSS 1500, and to meet customers individual requirements.

for . . .

chemical, pharmaceutical, cosmetic, dairy, brewery, food, canning, and paper making industries.

by . . .

highly skilled staff, conversant with modern welding techniques and manufacturing "know how" utilising Argon arc, Metallic arc, and resistance welding.

500 gallon pressure reaction agitator. F.M.B. quality, Polished inside and out. By courtesy of Messrs. Van den Burgh & Jurgens.

Consult . . .

STAINLESS STEEL PLANT LTD.

FABRICATORS TO INDUSTRY — SSP LTD — A SERVICE IN STAINLESS STEEL

Head Office and Works:
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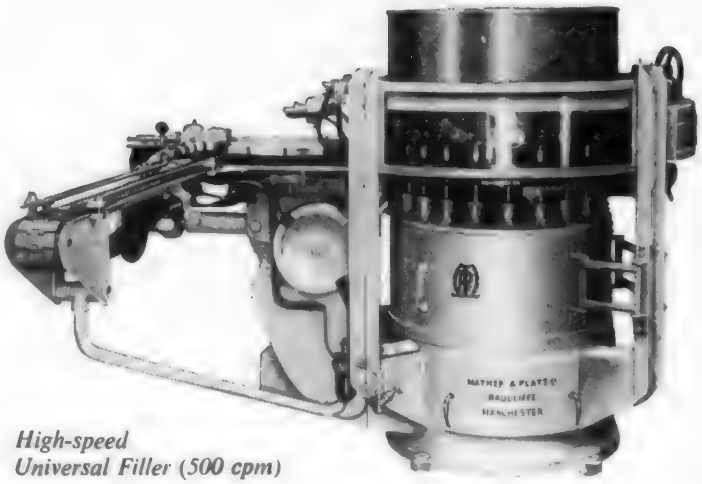
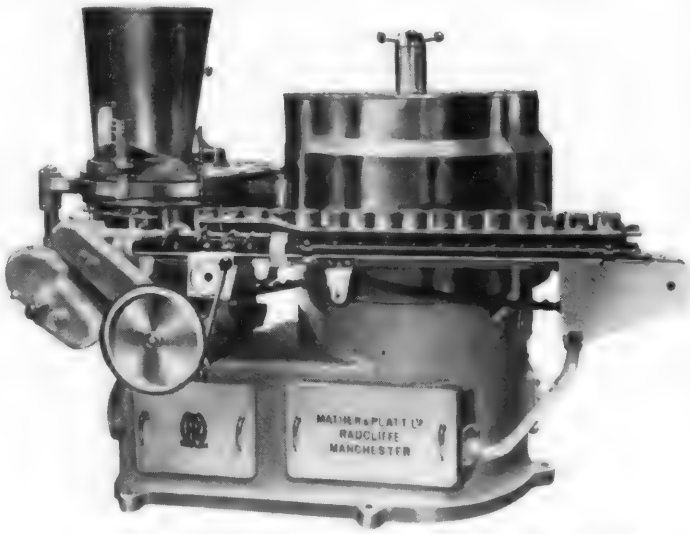
London Office: Telephone: ELTHAM 1280 Manchester Office: ECCLES 4118



High-speed Universal Filler (500 cpm)



High-speed Solid and Liquid Filler (300 cpm)

A10 Can Filler (30 cpm)

MODERN FILLING MACHINERY

These modern machines are part of a new and complete range of designs by Mather & Platt Ltd for the canning industry.
They combine a high degree of accuracy with high speed and simple and economical maintenance.

We are exhibiting at the
INTERNATIONAL PACKAGING EXHIBITION
Sept 8th–18th, 1959
Grand & National Halls
OLYMPIA
London

STAND No. 25D

Mather & Platt
LIMITED

RADCLIFFE
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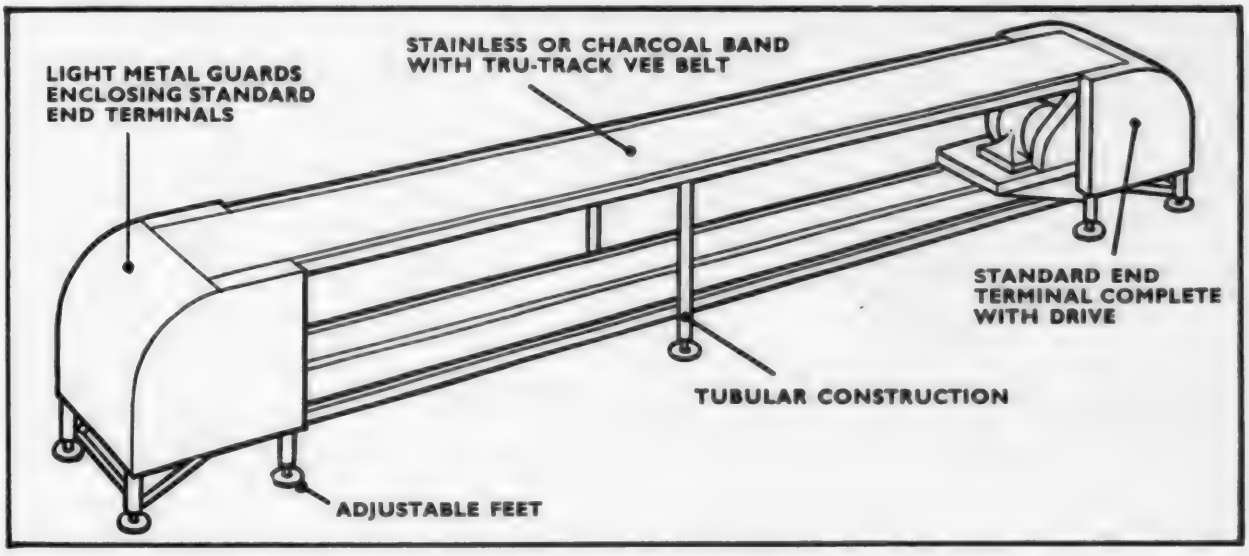
978

The Efficient and Hygienic Conveying of

need NOT be an Expensive Proposition


LIGHT METAL GUARDS ENCLOSING STANDARD END TERMINALS
STAINLESS OR CHARCOAL BAND WITH TRU-TRACK VEE BELT
STANDARD END TERMINAL COMPLETE WITH DRIVE
TUBULAR CONSTRUCTION
ADJUSTABLE FEET

with STANDARDISED TRU-TRACK CONVEYORS

This photograph shows a typical installation of a conveyor for preparing hams in a food factory

Sandvik Stainless Steel Band Conveyors have been specially designed to provide the most hygienic method of handling foodstuffs. They are supplied in band widths from 4 to 32 inches and have a hard smooth surface which has already proved its efficiency with many well-known manufacturers.

The Tru-Track feature ensures constant band tracking with minimum clearances of conveyor structure, which is built up of standard tubular sections to provide a perfect dust-free unit capable of being extended or shortened as desired. You will be surprised at the relatively low cost of these standardised conveyors, further details of which, complete with specification, will be supplied on application.

Sandvik **STEEL BAND CONVEYORS LTD.**

DAWLISH ROAD, SELLY OAK, BIRMINGHAM, 29 Telephone: Selly Oak 1113-4-5 Telegrams: Simplicity, Birmingham

SSBC

when your product begins as a formula...

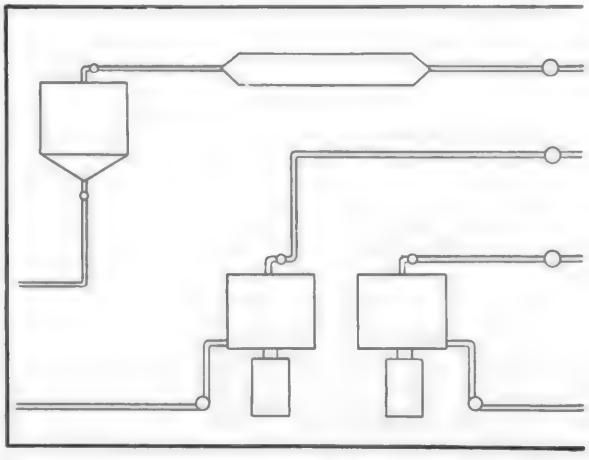
PRODUCTIVITY CALLS

FIRST YOUR FORMULA. It was born in your laboratory out of hard thinking, patient work and hopeful spending. Now it is ready to be turned into productivity and profits. Now speed comes into the picture; speed and volume. It's going to be thousands of gallons now, not pipettes full. Yet it has all got to be as precise in the factory as it was in the laboratory. Clearly a matter of measured batch dispensing and blending; a problem of process control.

THE AGE OF AUTOMATION

This was the picture we at Measurement had in our mind's eye when we were working on the Measurement *Automatic* Liquid Process Control system. Industry, we knew, would want accuracy and speed, and a modern way of applying it. An up-to-the-minute way. In this modern age the bucket is out, mainly because it excludes accuracy. Lifting and trucking must be eliminated because firstly it results in hold-ups, secondly in a waste of labour, and thirdly fatigue with its resulting fall-off in rate of production. Our equipment aims at automatically dispensing the right quantity to the right place at the right time, with all the necessary indication and records made automatically en route. The age of automation inspires sound business men to ask for the right installation for the job and no making shift. Control is the keyword.

"Backed by our years of experience", as the advertisements say (for we have been making liquid meters, pumps and electrical control apparatus for a very long time), we set about meeting this challenge. Years of research finally produced



the instrumentation that offered the flexibility which is essential, and the standardisation which makes the system an economic proposition for industry.

A FLEXIBLE SYSTEM

Today Measurement equipment is used in handling a large number of liquids in food manufacture, paper making, oil blending and chemical mixing processes. Liquids handled range from condensed milk to caustic liquors, and from benzine to beef dripping, and at Measurement Limited there is a catch phrase, " If it flows in a pipeline, then we can meter it".

ADVISORY SERVICE

We offer advice, designs and drawings to cover any complete liquid handling installation to suit any process—*your* own particular process. Given dimensional details, components can be supplied to be fitted into existing panels; otherwise we would supply complete wall-mounted or bench-mounted panels, or console models, tested and ready for installation. Servicing is a thing we regard as a duty at Measurement.

PUNCHED CARD SYSTEM

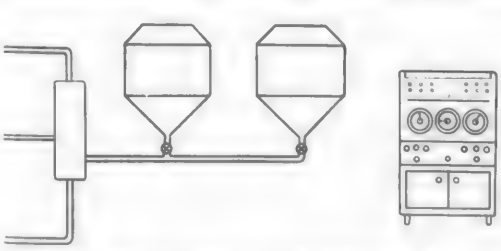
Not only does the Measurement system make Liquid Process Control merely a matter of pressing buttons, now batch delivery and blending can be completely preset and controlled by the punched card system!

SCRIBBANS-KEMP (BAKERIES) LIMITED
Control panel for automatic blending of liquids used in biscuit manufacture at the factory of Scribbans-Kemp (Bakeries) Limited, Grimsby.

FOR MEASUREMENT
LIMITED

A WIDE RANGE OF INSTRUMENTS

Whenever a liquid has to be handled, Measurement Limited make equipment to do the job, from indicating a total consumption of a liquid to the automatic dispensing, blending and mixing of various liquids.



Automatic dispensing of liquid from alternative storage tanks to a blending tank and to two rotary mixing machines. The three meters are denoted thus —○, and the three indicators are remotely mounted in a control panel with signal lamps to confirm operation of meters, valves and pumps.

The range of products include:—

(a) Meters made in various metals and moulded materials to enable almost any particle-free liquid to be metered.
(b) Meters with small pointer type indices.
(c) Meters with small direct reading counters.
(d) Meters with resettable direct reading numeral rollers.
(e) Meters with remote reading magnetic counters.
(f) Meters with horizontal or vertical large dial instruments having resettable pointers.
(g) Meters with automatic presettable indicators that enable the operation of valves, pumps and warning devices.
(h) Complete panels with auto preset indicators, signal lamps and push buttons for wall mounting or free standing.
(i) Schemes involving a number of meters dispensing liquids to one outlet.
(j) Schemes where a number of liquids are dispensed through one meter.
(k) Automatic actuation of metering equipment by photo-electric cell or contact operating devices.
(l) Complete panels incorporating mimic diagrams.
(m) Complete auto preset equipment that could be preset by a punched card reader unit.

★ *You may be tempted to tear out this advertisement for reference. Well, it's always a pity to spoil a book: get your Secretary to drop us a card and we'll gladly send you a reprint of these pages. A letter with more detailed requests will, of course, receive more detailed attention. Write to:—*

MEASUREMENT LIMITED

TAMESIDE WORKS DOBCROSS, NR. OLDHAM, LANCS.
Telephone: Delph 424 (5 lines) *Telegrams:* Supermeter Dobcross
MEASUREMENT ENGINEERING LIMITED P.O. Box 2305, Wellington C.I.
PARKINSON COWAN (S.A.) (Pty.) Ltd. P.O. Box 1113, Johannesburg
Export Enquiries to: Parkinson Cowan Group Exports Ltd., Terminal House, Grosvenor Gardens, London S.W.1.
Telephone: SLOANE 0111/4 *Cables:* DISC London

By kind permission of the N.C.B. North Eastern Division

PROTECT WITH EVOKOTE

EPIKOTE RESIN BASED PAINTS

Above:—Ammonium Sulphate plant at Manvers Main Coking Plant, treated with Evokote Type 10
Below:—Maplewood floor treated with Evokote Type 20 at the works of John Mackintosh & Sons Ltd., Halifax

—proof against mineral and organic acids, fruit juices, steam, caustic soda, detergents, abrasions

A PRODUCT OF EVODE OF STAFFORD

Manufacturers of BITUGEL, EVODYNE and EVO-LED paints

✳ **SEND FOR LITERATURE** EVODE LTD., (PAINTS DIVISION) STAFFORD. Telephone: 2241-5

London Office: 82 VICTORIA STREET, S.W.1. Telephone: ABBey 4622-3

H-W.118

PERTINENT VIEWPOINTS ON R.O. SEALS

AUTOMATIC APPLICATION SPEEDS UP BOTTLE PACKING AND ENHANCES THE APPEARANCE OF THE PRODUCT . . .

say Works Managers

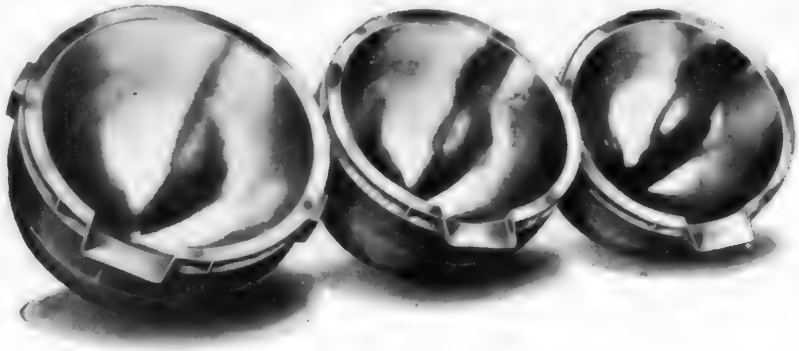
The great advantage of R.O. Seals in the packing of glass containers is their speedy, automatic application. Every cap is individually moulded to the threads of each bottle or jar. Sealing is hermetically perfect, guaranteeing the purity and freshness of the contents until sold. The R.O. Seal offers MORE! A neat, practical closure that does full justice to your product, carries your trade name in colour and assists in its identification at point of sale. Available in plain or pilfer-proof styles.

R.O. SEALS

Write now for samples and descriptive literature.

METAL CLOSURES LIMITED, WEST BROMWICH, STAFFS.

LONDON OFFICE: 40 BROOK STREET, LONDON, W.1

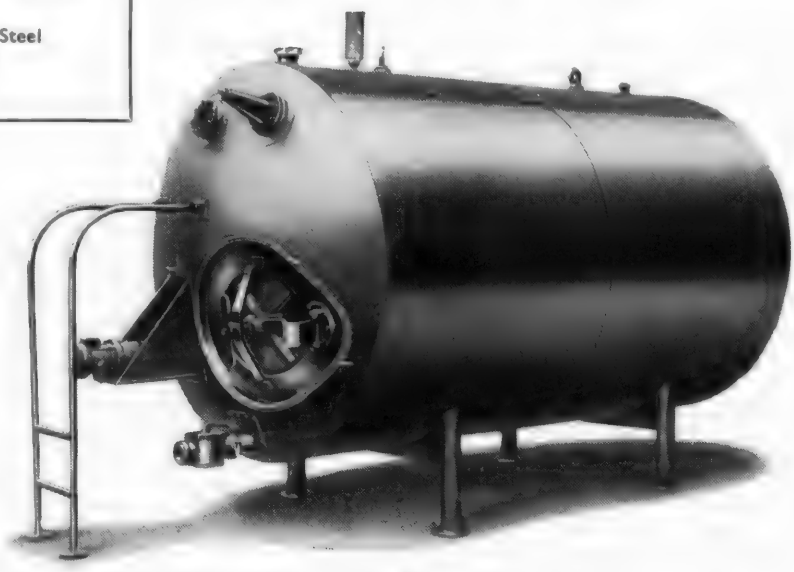


BUTTERFIELD

STAINLESS STEEL PLANT

Illustrated above:
A row of Stainless Steel Jacketed Pans for a series of Tilting Pans

And on the right:
1,000 gallon Stainless Steel Cream Storage Tank for 'Ambrosia' Ltd.



Butterfield craftsmen meet the ever expanding demand of the Food Industry for Stainless Steel Equipment with precise compliance to specification and with a very high standard of finish

Butterfields of SHIPLEY

We also fabricate in Mild Steel Aluminium and Nickel

W. P. BUTTERFIELD LTD
P.O. Box 38 Shipley Yorks
Telephone 52244 (8 lines)

BRANCHES: London Tel. HOLborn 2455 (4 lines)
Birmingham Tel. EAS 0871 and EAS 2241 Bristol Tel. 27905
Liverpool Tel. CENtral 0829 Manchester Tel. BLAckfriars 9417
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Dublin Tel. 73475 and 79745

North-of-the-Border bottles

THIS is such a peculiar factory. All they make is bottles—and they're all empties. Full of nothing but air. But at least it's Scottish air. Yes, they're all Scotch bottles. No, not just whisky—bottles for everything. All made by Scots out of Scottish glass right here in Alloa. They're native, home-blown, North-of-the-Border bottles one and all. Scots, wha hae!

The Alloa Glass Work Company provides a first-class, on-the-spot glass packaging service. You get individual treatment. There are excellent design and research facilities. And the Alloa Company has an associated closure company—also in Scotland. Please get in touch and see how Alloa can help in *your* business.

ALLOA GLASS

The Alloa Glass Work Co. Ltd.,
Glasshouse Loan, Alloa, Scotland. Telephone: Alloa 761

A new question for every designer of mechanical assemblies

—WET or DRY?

LUBRICATION: A HIDDEN CONSTRAINT

Every time a designer puts pencil to paper to sketch an assembly of moving parts he works within a constraint which has become so familiar that he scarcely recognises its existence. This constraint is the necessity to provide oil, grease, graphite or pressure lubrication for all sliding surfaces. GLACIER DU Bearings break this constraint. *They never need oiling!*

DU: A SENSATIONAL BREAK-THROUGH

DU Bearings have been described in America as "a sensational break-through in bearing technology". The reason for this is that although dry bearing materials had been in use before—in process industries and extreme-temperature-duty applications, for example—until GLACIER developed DU, no dry bearing material had been discovered which combined such low friction with such high resistance to wear and great mechanical strength. DU Bearings for the first time widen the scope of dry bearings to include almost every application. They were originally developed—and are made *exclusively*—by GLACIER.

WHAT IS DU?

DU, the material from which GLACIER DU Bearings are made, consists of a tin-plated steel backing on which a thin layer of porous bronze is laid. This is impregnated with a mixture of lead and a fluorocarbon known as FLUON*. *DU combines all the advantages of these materials*, including resistance to wear, low friction and anti-adhesiveness, high thermal conductivity, low thermal expansion, high mechanical strength, wide service temperature range—from —200° to +327°C.—resistance to abrasive atmospheres, elimination of contamination, and the ability to run submerged even in corrosive liquids—often with improved performance. Its lasting powers are excellent; it can carry heavy loads at high speeds; it requires no attention—and of course no oil whatsoever.

**I.C.I. Trademark*

PROVED IN OPERATION

For a number of years GLACIER DRY Bearings have been very successfully used in a number of specialised applications. There are nearly 400 of them in each Comet. Other users include such distinguished names as de Havilland, Rolls-Royce, Courtaulds, Jaguar, E.M.I. and Metropolitan Vickers. But *throughout the mechanical field* there are applications for DU. *Dry mechanical assemblies* are now a possibility to be borne in mind by every designer. GLACIER DU Bearings can bring about tremendous savings in design, cost and maintenance.

FIND OUT ABOUT DU!

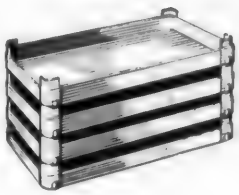
GLACIER will be happy to send you a free technical handbook about DU. Write to:

GLACIER

THE GLACIER METAL COMPANY LIMITED, ALPERTON, WEMBLEY, MIDDLESEX. TELEPHONE: PERIVALE 6611 TELEGRAMS: GLAMET WEMBLEY. TELEX 22729

HYGIENE puts YOU on OUR metal!

ALUMINIUM STACKING BOWLS



An extremely robust container of 16″ diameter × 8½″ or 12″ or 15½″ deep—5, 7½ or 10 gallons capacity respectively. Manufactured from 10 gauge aluminium with drop down, or fixed, side handles and stacking feature. Used in a wide variety of trades for the conveying or storage of all kinds of wet or dry foods. All sizes interstack and lids can also be provided.

WARWICK
'WARCO'
Reg Trade Mark
ENGLAND
First Choice for Aluminium Equipment

Enquiries for all your Aluminium Equipment welcomed by

WARWICK PRODUCTION COMPANY LTD

A MEMBER OF THE ALMIN GROUP

BIRMINGHAM ROAD, WARWICK **Telephone: WARWICK 693-696**

GUARANTEED FIVE YEARS

Every FRIGIDAIRE CONDENSING UNIT

Frigidaire have the most complete range of condensing units, ranging from one-sixth to ten horse power, with a selection of more than 60 model variations. Every unit is backed by a five-year warranty which applies not only to compressors, but to condensers, belts, receivers and oil separators as well.

Frigidaire condensing units are in service throughout the world, bringing in attractive profits to all commercial users. Scrupulous attention is given to every stage of their manufacture for they are the most important part of the refrigerating system. They are the very heart of the operation.

FRIGIDAIRE means business—for you!

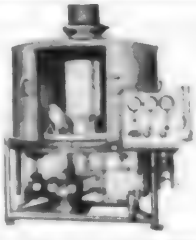
REGD. T.M.

FRIGIDAIRE DIVISION OF GENERAL MOTORS LIMITED, STAG LANE, KINGSBURY, LONDON, N.W.9. TEL: COLINDALE 6541

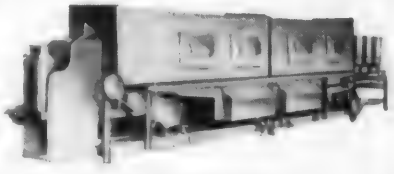
Ever seen a horse washing-up?

Yes . . . 'a horse', we said; horsepower intelligently applied to wash food cans cleaner . . . quicker . . . to economise in man-power.
There are WRIGHT HARGREAVES installations for big jobs or small . . . for jobs simple or complicated; for . . . jobs! Equipment ranges from simple, hand-fed rotary units up to fully automatic systems which include, where needed, automatic removal, washing and replacement of lids.
Whatever washing problems may confront the food industry, W.H. will solve them, either from stock or to a plan, tailored to suit your individual needs, including power conveyors with non-friction bends.

The W. H. Minor Hand Operated Rotary Food-can and Churn Washer; will wash any size or kind of can up to 12 gallons, at the rate of 300 cans per day. Simple, economical, low capital cost.



The W. H. Junior STRAIGHTAWAY Can Washer. Washes . . . sterilizes . . . containers of up to 12 gallons at the rate of from 4 to 8 cans per minute. Low consumption; easy to operate.



Our sales engineers will be happy to study your problem and to make their recommendations.

WRIGHT HARGREAVES ENGINEERING CO. LTD.

OFFICE AND WORKS: BROOKHOUSE LANE · BLACKBURN · LANCS.

TELEPHONE: BLACKBURN 4195-6 · TELEGRAMS: RITELINES, BLACKBURN.

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Smee's W.H.2

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A THOUGHT FOR FOODS

Protein additions?

Vitamin B complex?

Starch conversion?

Fermentation balance?

Flavour development?

Laboratory media?

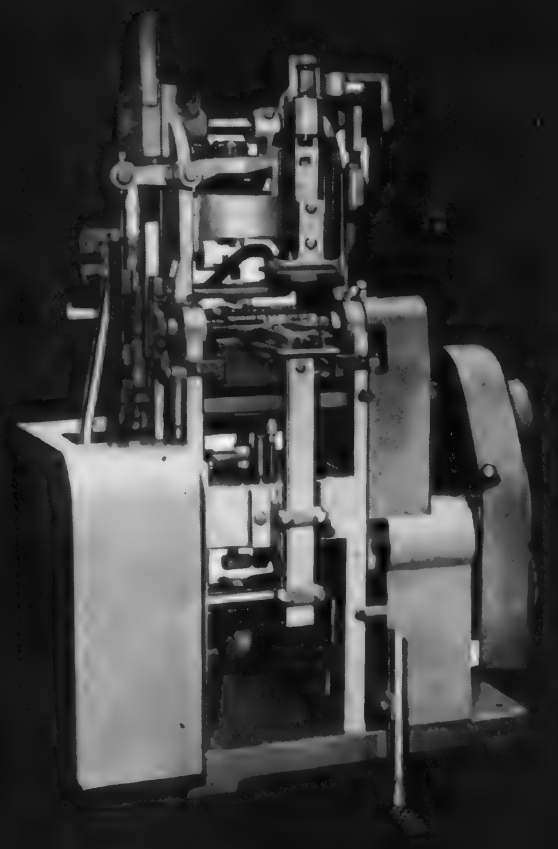
GIVE US FOOD FOR THOUGHT!

MUNTON & FISON LIMITED

CEDARS FACTORY STOWMARKET SUFFOLK

Maltsters for more than a Century

Labelling



The
Pony Labelrite
Labelling Machine

PACKAGING MACHINERY (PETERS) LTD.

Bovril puts beef into bottles by Forster's

This familiar tubby bottle is made by Forster's in its identical millions. Makes you think, doesn't it? Makes you think that Forster's could do a lot of good for your own product. Why not enquire? Forster's have a design and technical service second to none. Prompt, business-like, efficient and . . . first class in glass, in design, in service, in technical advice.

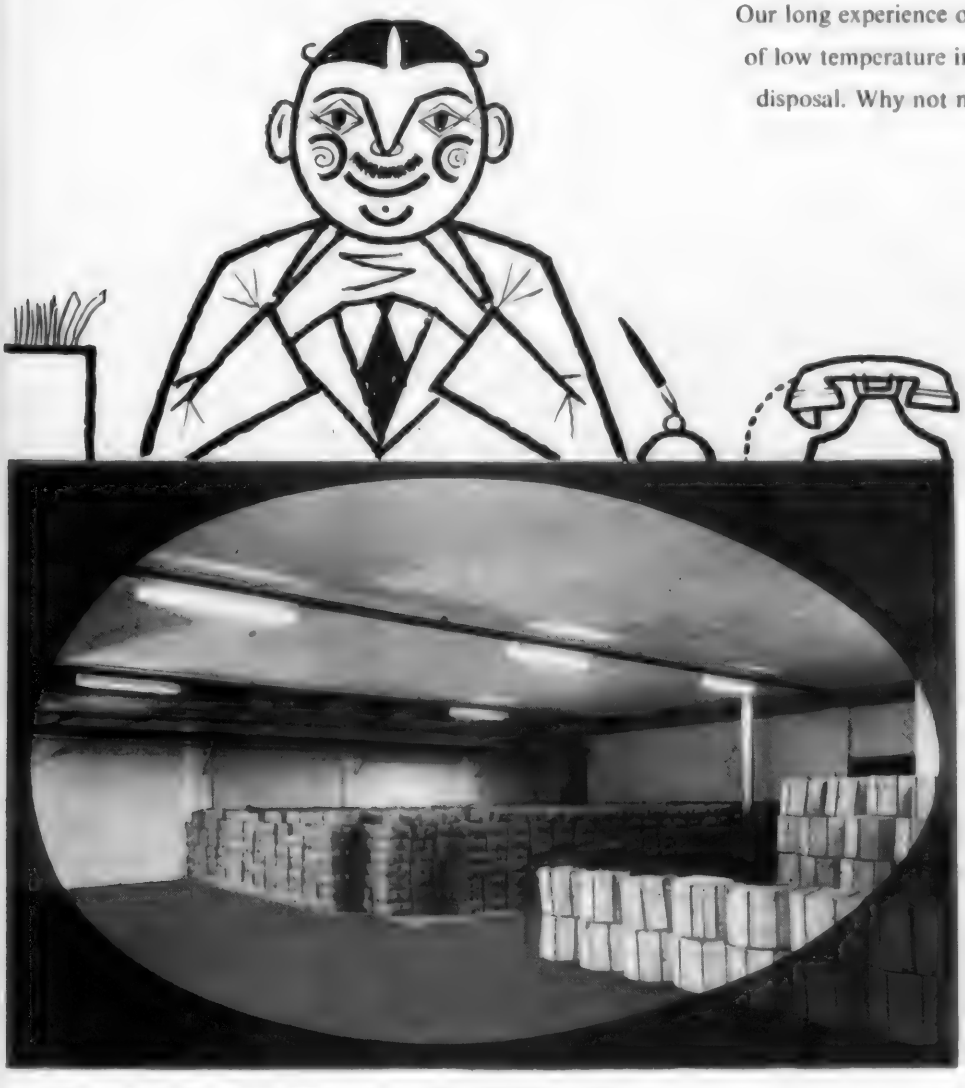
FORSTER'S

FOR STRENGTH

FORSTER'S GLASS CO LTD · ST HELENS · LANCS · Tel: 2256 OFFICES & WAREHOUSES AT LONDON & GLASGOW

Did you know..

that in addition to building large cold stores we are also specialists in the "built in" application of low temperature insulation, and factory insulation? Whether you are planning a new cold room, improvements or extensions, Smiths Insulations can offer you a complete service from design to completion, or ready for your nominated refrigeration engineers. Our long experience of *all* applications of low temperature insulation is at your disposal. Why not make use of it?



Photograph by kind permission of Trafford Park Cold Storage Ltd.

Smiths for complete built-in schemes.

SMITHS INSULATIONS LTD.

Est: 1874 BURTON-ON-TRENT Tel: 2061/2

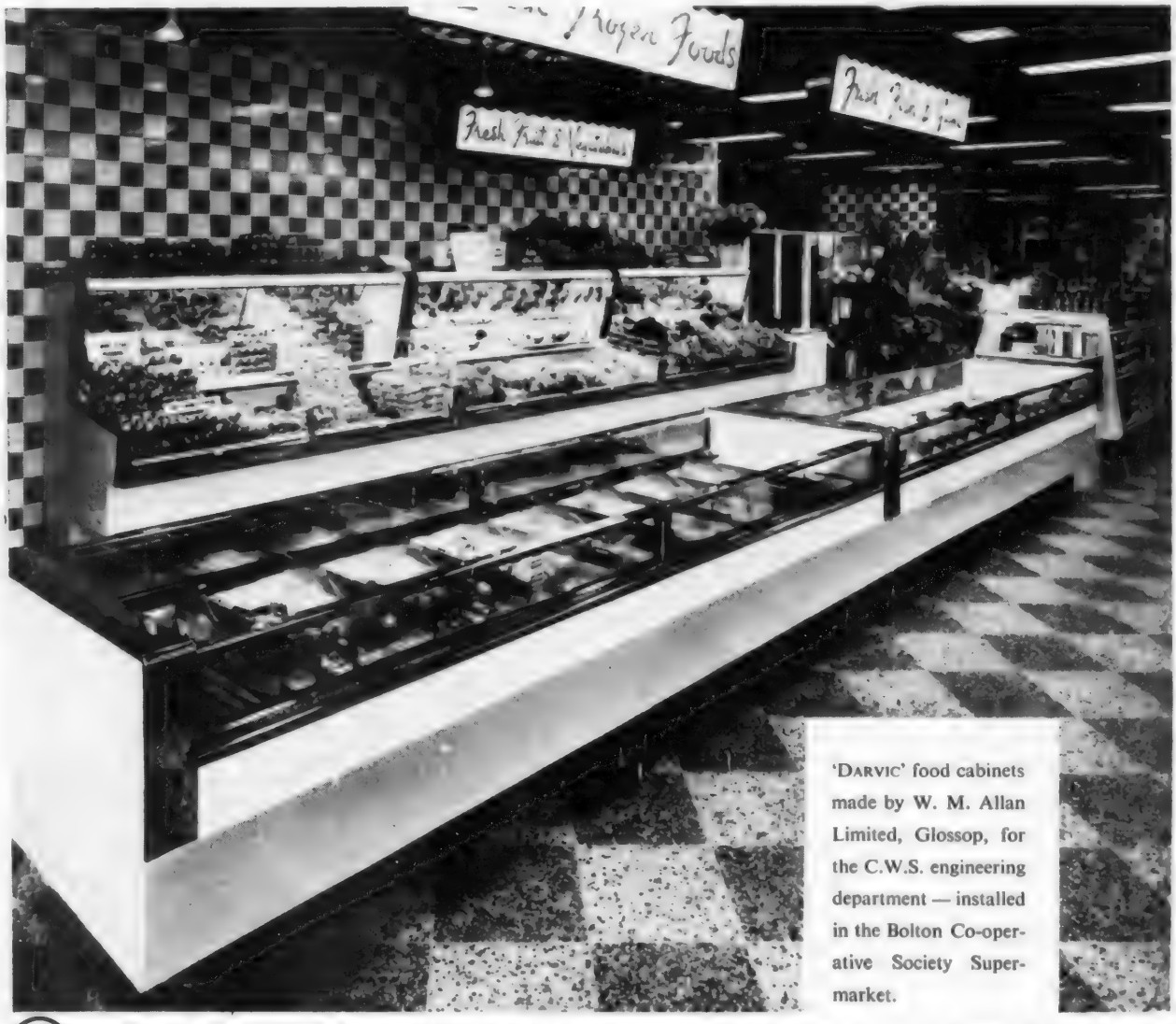
London Office: 105, Empire House, St. Martins-le-Grand, E.C.1. Tel: MONarch 2000

'Darvic' is the registered trade mark for the rigid p.v.c. sheet made by I.C.I.

'Darvic' keeps these C.W.S. food cabinets clean, hygienic and good looking

This new supermarket at Bolton uses food cabinets faced with 'Darvic' p.v.c. sheet. 'Darvic' is a perfectly hygienic material. It will not taint food or drink and is completely odourless. Its smooth, corrosion-resistant surface makes it very easy to clean. 'Darvic' is light but tough and is rigid even in thin sheets.

'Darvic' has high impact strength—so it will take hard knocks. Because 'Darvic' is easily shaped, and has low thermal conductivity it is the ideal material for exterior or interior panelling of cold rooms, refrigerators and refrigerated cabinets. It is available in a wide range of attractive colours, including multi-coloured laminates.

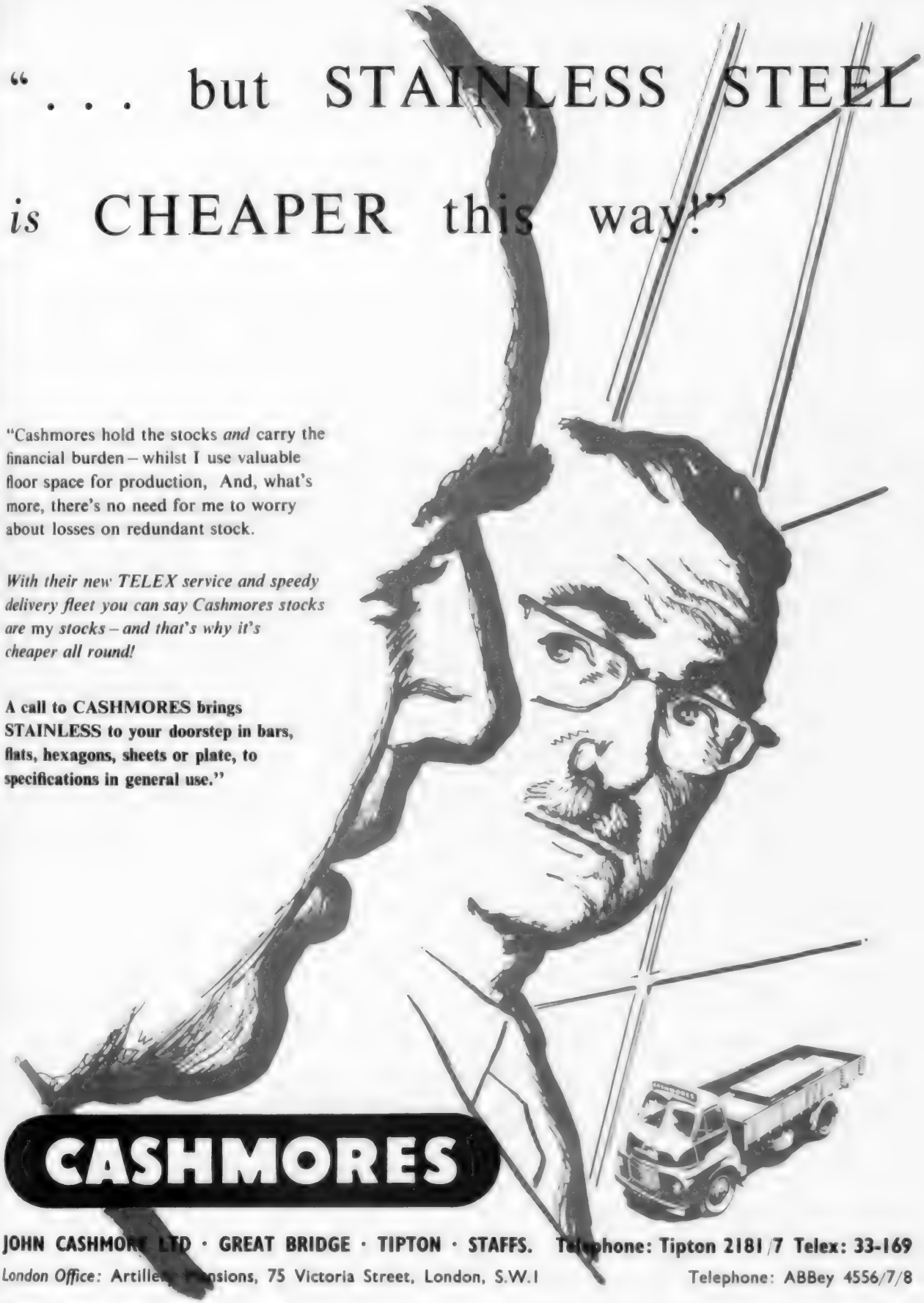


'DARVIC' food cabinets made by W. M. Allan Limited, Glossop, for the C.W.S. engineering department — installed in the Bolton Co-operative Society Supermarket.

ICI IMPERIAL CHEMICAL INDUSTRIES LIMITED · LONDON S.W.1

PD.66

"... but STAINLESS STEEL *is* CHEAPER this way!"



"Cashmores hold the stocks *and* carry the financial burden – whilst I use valuable floor space for production, And, what's more, there's no need for me to worry about losses on redundant stock.

With their new TELEX service and speedy delivery fleet you can say Cashmores stocks are my *stocks – and that's why it's cheaper all round!*

A call to CASHMORES brings STAINLESS to your doorstep in bars, flats, hexagons, sheets or plate, to specifications in general use."

CASHMORES

JOHN CASHMORE LTD · GREAT BRIDGE · TIPTON · STAFFS. Telephone: Tipton 2181/7 Telex: 33-169

London Office: Artillery Mansions, 75 Victoria Street, London, S.W.1 Telephone: ABBey 4556/7/8

Rapid pea/bean filling made clean splashless by new auto machine

Type 1FF 10-head Automatic Pea/Bean Filling Machine.

This new Kellie model

fills half the liquid, then the solids, finally the other half of the liquid. Air does not trap in the cans nor liquid overflow. Up to 180 cans per minute, in all sizes up to A2½. Self contained motor as illustrated or synchronised drive from the Double Seamer.

KELLIE for FOOD PLANT

ROBERT KELLIE & SON LIMITED · DUNDEE · SCOTLAND

Telephone: Dundee 2819 (2 lines)

Telegraphic and Cable address: "Kellie" Dundee. Code A.B.C. (5th Edn.)

Presented with pride!

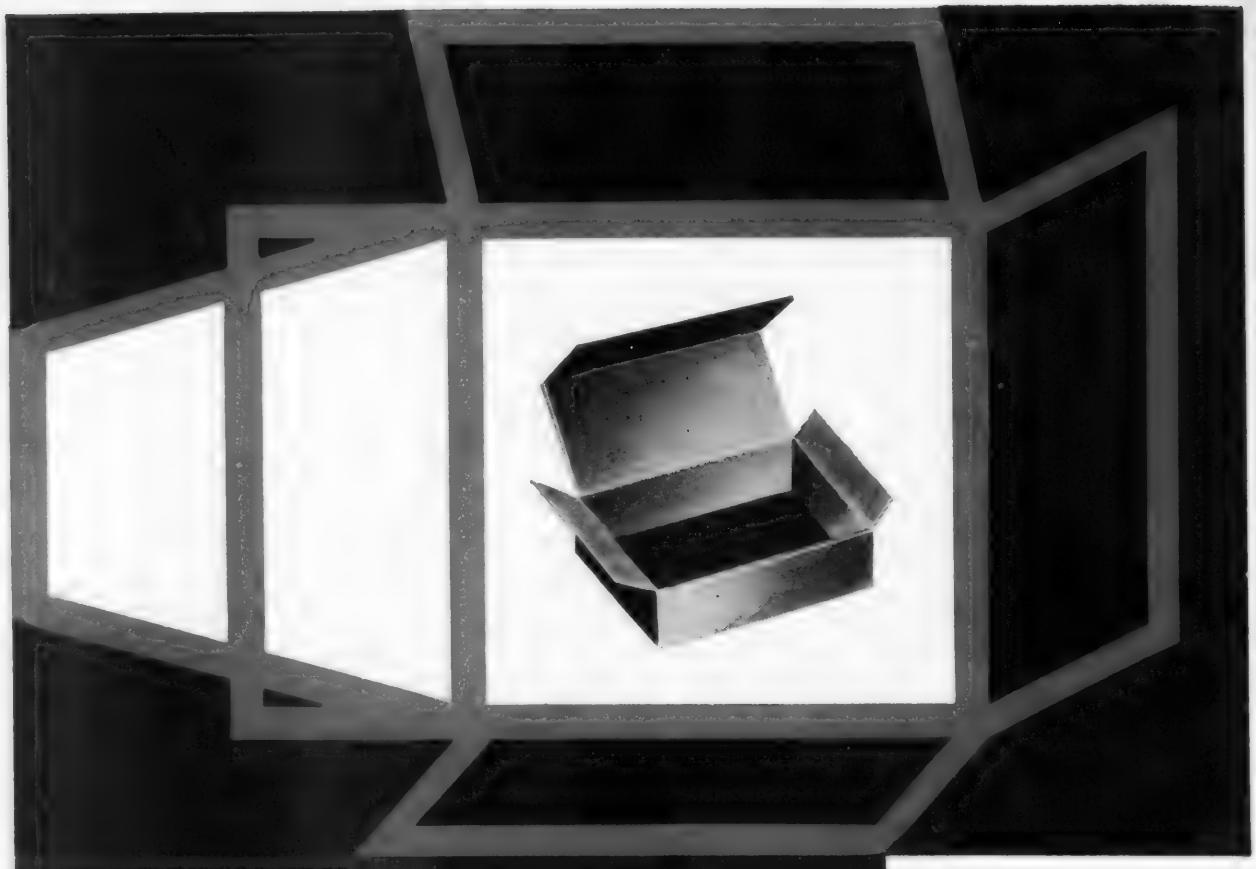
Seal your pack with "Viskrings" and establish confidence between you and your consumer. YOU can be confident that your bottling will reach the consumer perfect and intact. The CONSUMER will be confident that the contents are genuine and as expected—a fine product, perfectly presented. Seal all stoppered and screw-capped bottles with "Viskrings". There is a "Viskring" to fit every bottle neck, available in a wide range of colours. "Viskrings" can be printed with your brand symbol. Send your container complete with primary closure to us for fitting. We will return it with samples and quotations for any quantity.

- "Viskring" can be applied rapidly by hand—no machinery is necessary.
- They are self-adjusting.
- They prevent the blowing or riding of stoppers.
- They prevent the movement of screw caps once they are tightened.
- They afford protection for branded products and reduce pilferage and evaporation.
- CELLULOSE CLOSURES . . . Contain No Metal . . . Require No Adhesive.

for your Sales sake fit "Viskrings"

THE VISCOSE DEVELOPMENT CO. LTD.

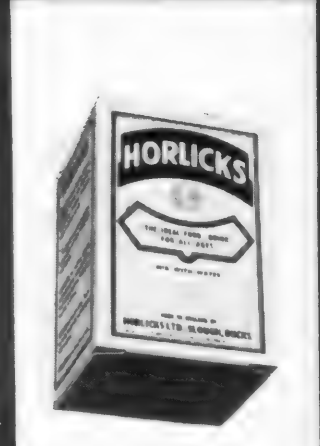
40 CHANCERY LANE, LONDON, W.C.2 Telephone: CHAncery 8111 Telegrams: Viskap Westcent London VC/4



unbeatable

for

eatables



Reed makes all types of cartons for all kinds of foodstuffs. Every one of these cartons not only safeguards but sells its contents, too!

In range, Reed Cartons are completely comprehensive — they include all forms of dummies and displays, simple folding cartons and outers. No matter what type or size or shape the commodity, Reed make a carton that will both shelter it and show it off.

In quality of materials, construction and printing, Reed Cartons are consistently first-class. Constant research is devoted to providing the latest and finest board, inks, varnishes and adhesives — precision machinery ensures the accuracy of construction required by automatic filling and only the most modern techniques and equipment are employed in the printing which gives every Reed Carton its eye-catching, sales-prompting distinction.

Allied to the intrinsic craft of Reed production is a system of quality control extending into every stage of the manufacturing process to maintain the highest standards.

In delivery, with three large factories strategically located, Reed service is both prompt and dependable. Knowing how vital are time and reliability to the Food Industry, Reed will supply all you need on the promised date.

In conclusion, the stimulus they give to sales means larger profits for the many customers — whether small in scope or household names — who put their faith and their foodstuffs in Reed Cartons.

WRITE TO REED for Leaflet No. 200 for full details of the Reed Carton service. At the same time, put Reed to the test by asking for a sample carton and a quotation to meet your specific needs.

nothing but the best goes into Reed Cartons

REED CARTON DIVISION

Reed

In the South:
GROPPER & COMPANY LIMITED
Thatcham, Newbury, Berkshire
Telephone: Thatcham 2235

In the North:
CUT-OUTS (CARTONS) LIMITED
Newcastle upon Tyne, 6
Telephone: Newcastle upon Tyne 2-9806

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RC9

JENNER

spiral chutes

The spiral chute provides a simple and effective means of controlled descent. It occupies little floor space —has quickly adjusted feeding and discharge attachments—can be combined with conveyors, and maintenance costs are nil.

Write for our comprehensive catalogue.

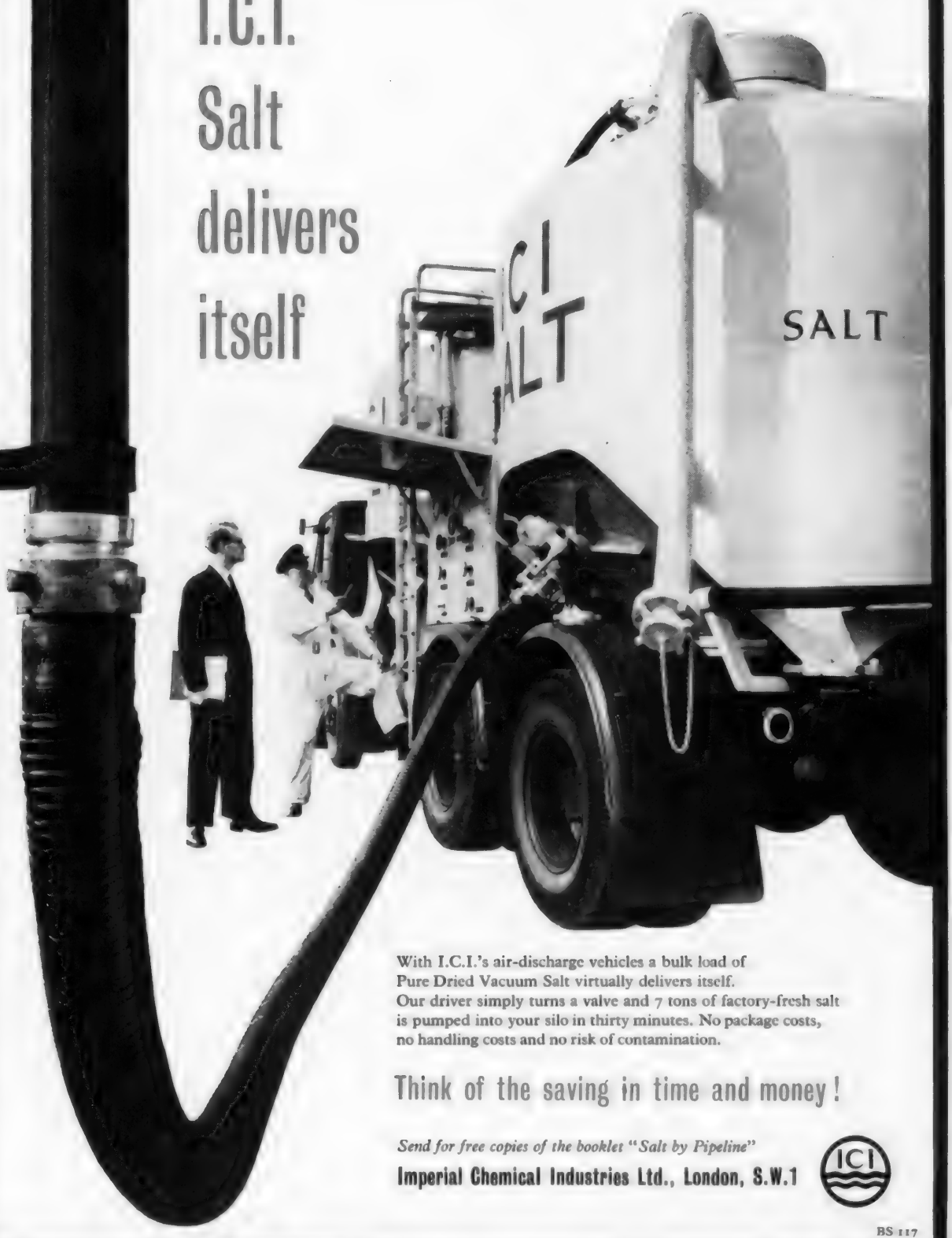
freight lifts

CUSTOM BUILT EQUIPMENT
ELEVATORS · SPIRAL CHUTES
FREIGHT LIFTS · SWING TRAY ELEVATORS

Conveyors
BELT · ROLLER · CHAIN & SLAT
MOBILE · TELESCOPIC OVERHEAD POWERED TURNS

A. & C. JENNER LTD. CLARENDON WORKS · MITCHAM · SURREY · Telephone: MITCHAM 4044-5
Northern Area—C. W. Folkes. Wilmslow 2167

I.C.I. Salt delivers itself



With I.C.I.'s air-discharge vehicles a bulk load of Pure Dried Vacuum Salt virtually delivers itself. Our driver simply turns a valve and 7 tons of factory-fresh salt is pumped into your silo in thirty minutes. No package costs, no handling costs and no risk of contamination.

Think of the saving in time and money!

Send for free copies of the booklet "Salt by Pipeline"

Imperial Chemical Industries Ltd., London, S.W.1

BS 117

—for QUICK deliveries of all

ENGINEERING SUPPLIES

including

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25 lines

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PACKINGS, JOINTINGS
BELTINGS, VEE-ROPES
OILS & GREASES
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W. H. WILLCOX & CO. LTD

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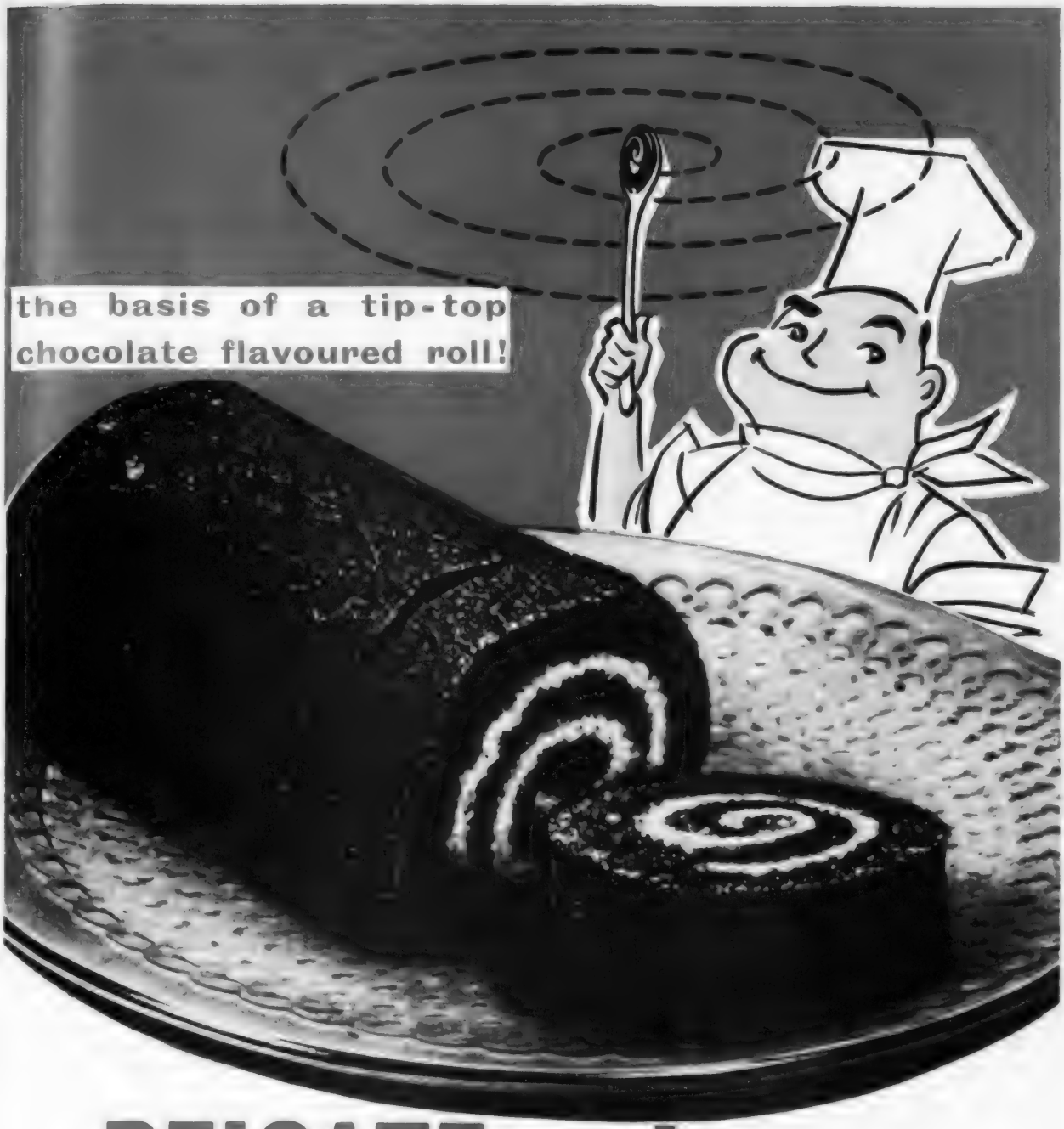

REIGATE BRAND
Chocolate Compound

Roll up! Roll up!
Customers buy again and again. Reigate Chocolate Compound—highly concentrated—for the genuine chocolate flavour and the natural chocolate colour.
Sample free.

Use ¾ oz. per 1 lb. of Swiss Roll

ESTD 1841
REI GATE
BRAND

WHITE, TOMKINS & COURAGE LTD.
REIGATE, SURREY

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have you the right support?

Perfection in the finished product is our common aim to-day. Are you making full use of all available support which is indispensable to your success? Caxton supply couvertures to a whole range of specifications—for biscuits, ice cream, sweets, cakes . . . whichever it is they will know the ideal chocolate blend for your products, too. What's more they have a keen research department always eager to improve the quality and appearance of the finished product—that means *your* finished product! Each problem is considered on its merits, so you can be sure, when you consult Caxton, that their highly qualified technical staff will supply you with just the couverture you require. Go ahead now with plans to improve your product by using a chocolate couverture made exactly to your own requirements by Caxton.

Caxton COUVERTURES CREATE CONFIDENCE

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NO DIRTY LOOKS

Permutit softened water ensures:

- Sparkling bloom-free clean bottles
- Efficient operation of bottle washing machinery
- No unnecessary re-washes
- Reduced maintenance costs

Permutit Fully Automatic and Manually operated Softeners are available to soften any volume of water.

THE PERMUTIT COMPANY LIMITED

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Subsidiary Companies

THE PERMUTIT CO. OF AUSTRALIA PTY. LIMITED
567-573, Pacific Highway, Sydney, N.S.W.

★

THE PERMUTIT CO. OF SOUTH AFRICA (PTY.) LTD.
P.O. Box 6937, Johannesburg

ION EXCHANGE (CANADA) LTD., 33, Price Street, Toronto 5, Ontario

5 OF THE BEST...

We invite you to visit us at the INTERNATIONAL PACKAGING EXHIBITION
OLYMPIA LONDON
8-18 September, 1959
STAND No. 2F
Ground Floor Grand Hall

These five materials were developed to meet customers' special requirements.

LET OUR TECHNICAL SALES DEPARTMENT HELP YOU!

Phone for our representative to call and see you.

FISHER'S FOILS

FISHER'S FOILS LTD. EXHIBITION GROUNDS, WEMBLEY, MIDDLESEX, ENGLAND

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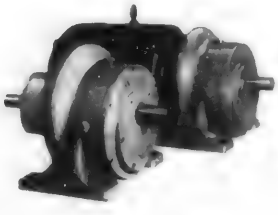

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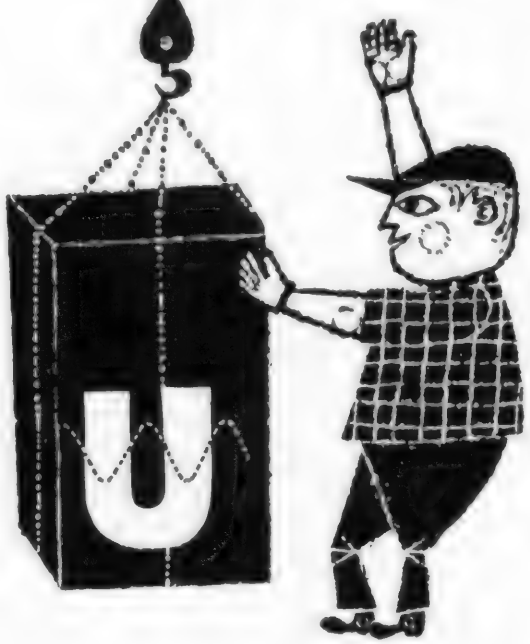

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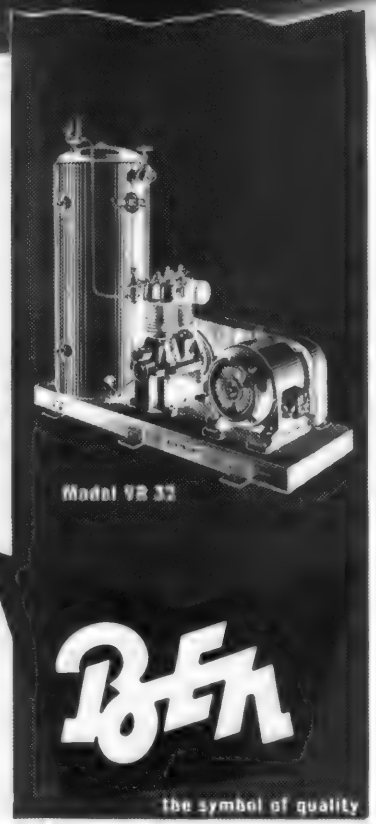

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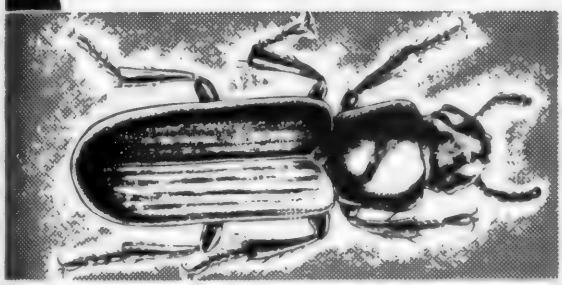
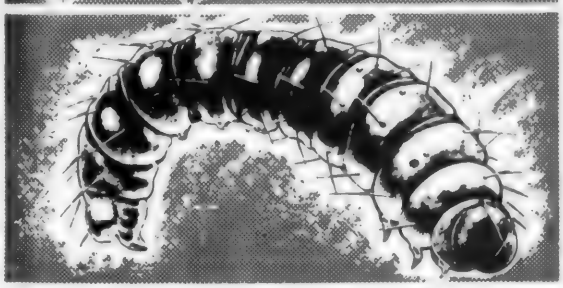


Flour Beetle (Actual size, approx. 4 mm)



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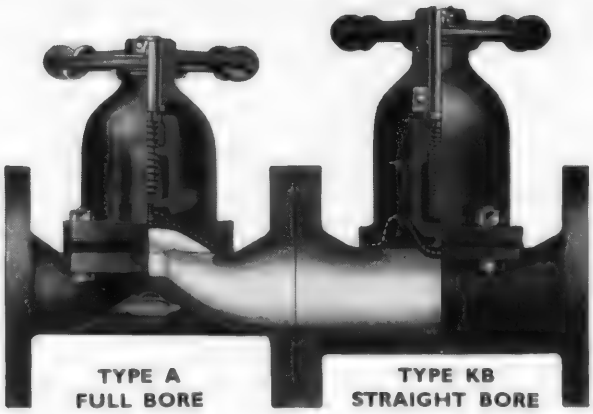

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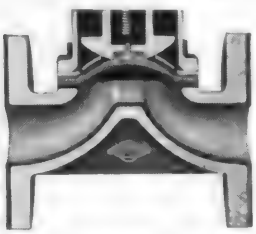
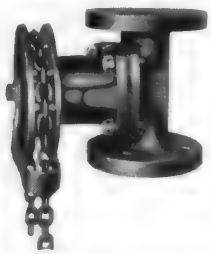
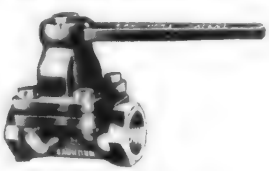


Glass-lined bodies provide hygienic conditions for edible fluids.



Chainwheel Operation for inaccessible locations.



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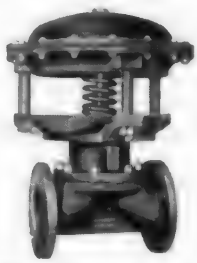

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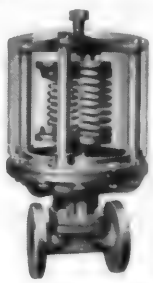

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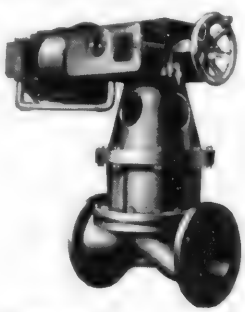

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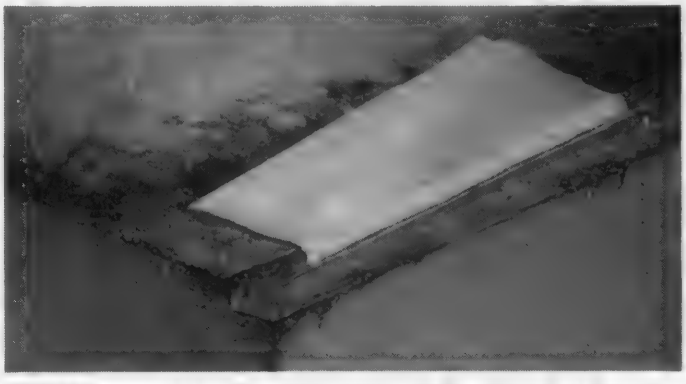

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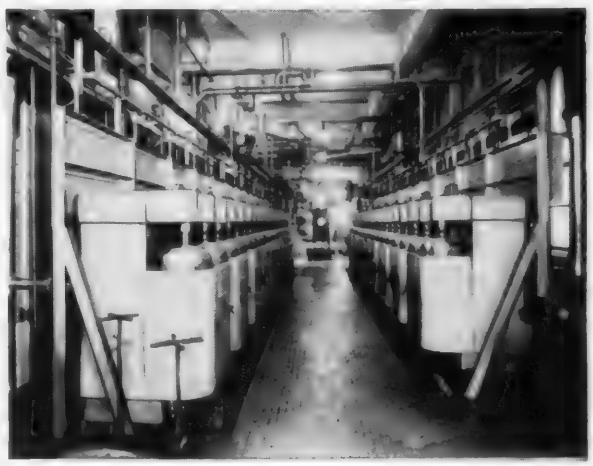

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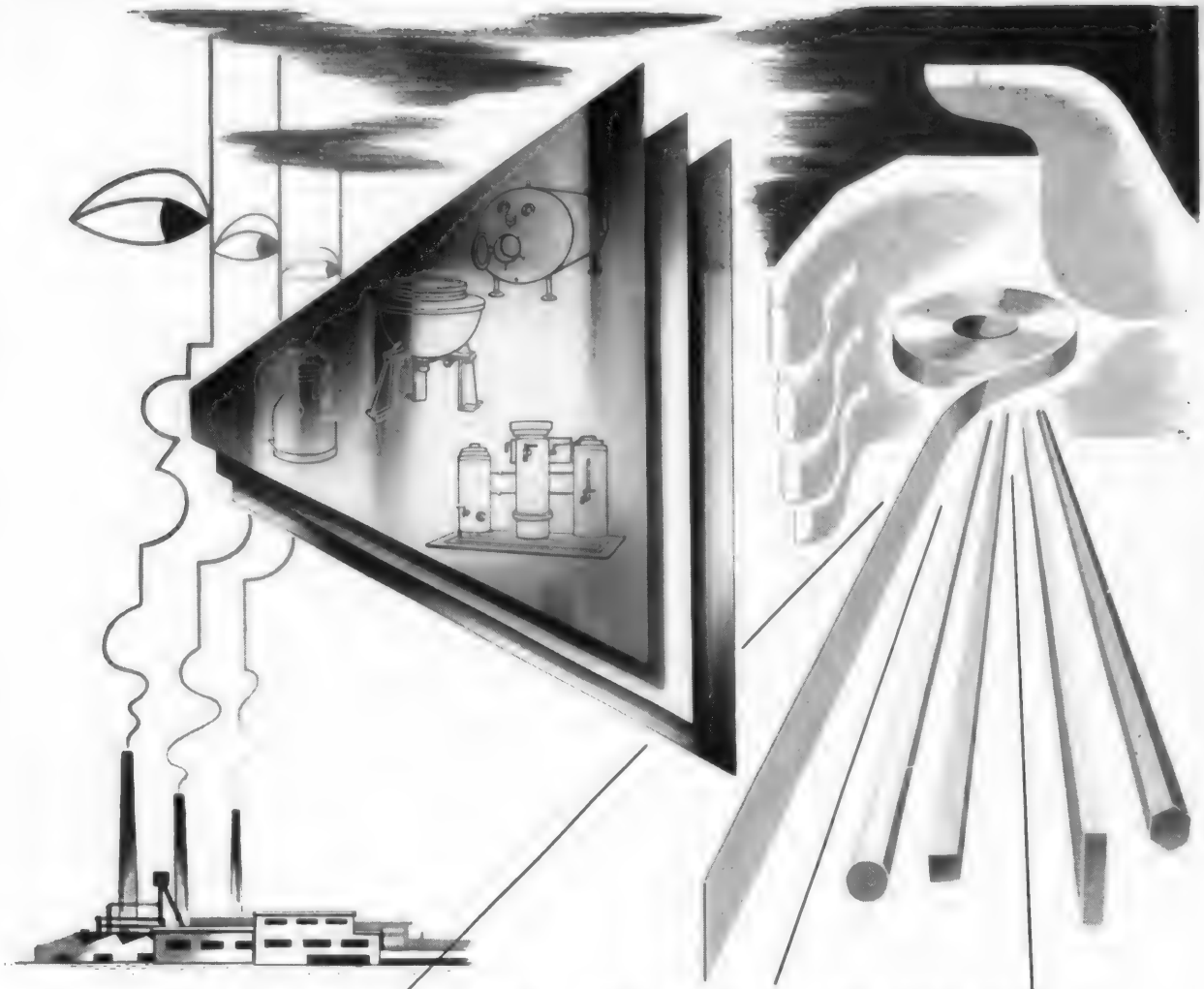

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FOOD MANUFACTURE

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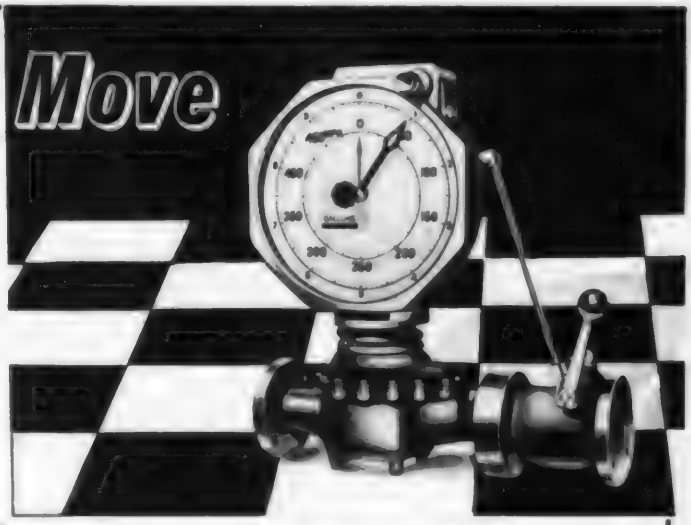

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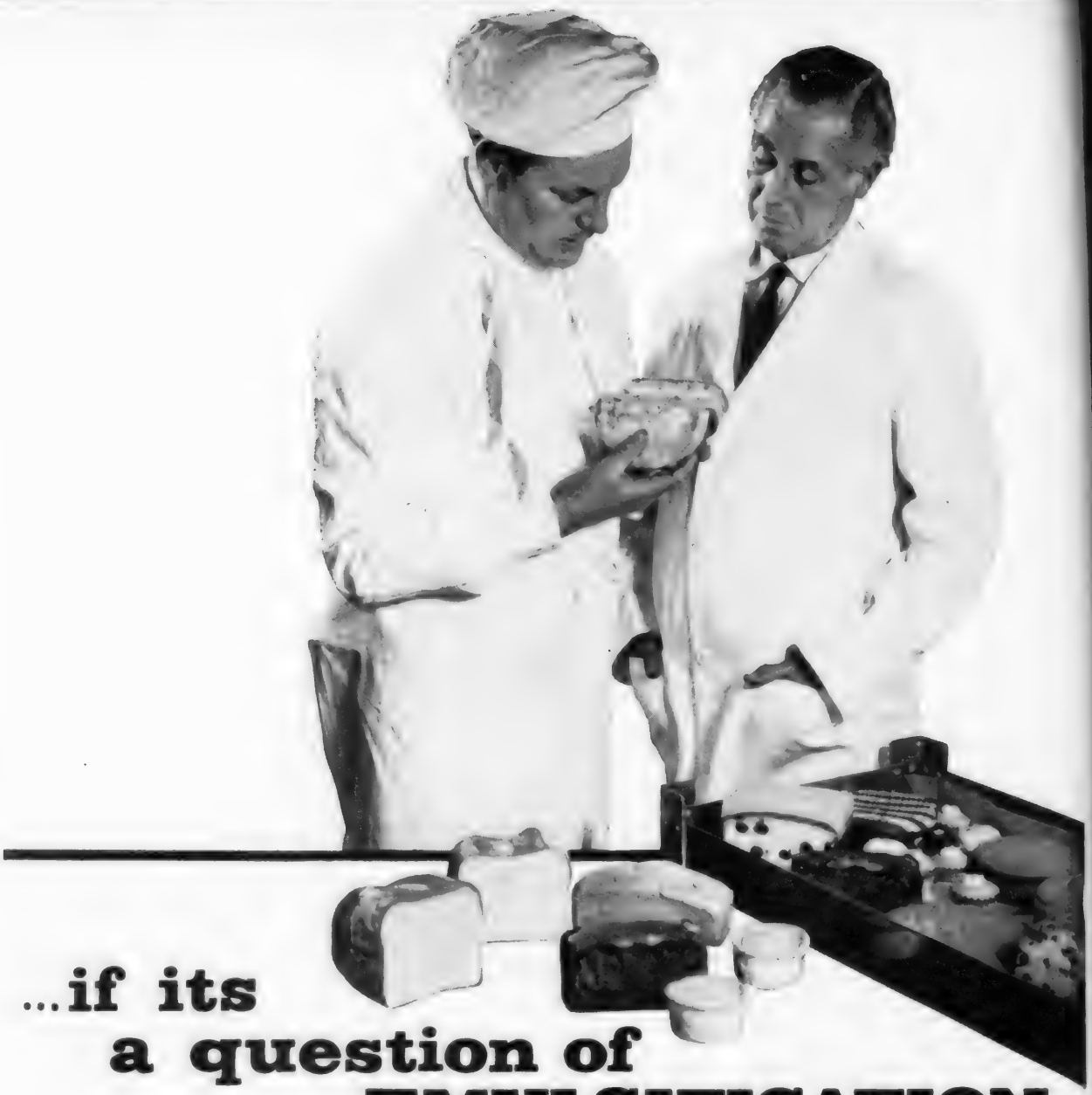

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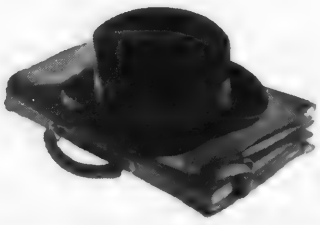

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FOOD MANUFACTURE

Vol. XXXIV, No. 6 June 1, 1959

Demographic facts and fallacies

PERHAPS there never was a time in human history when the world was free from hunger. Today, in spite of the spectacular advances in science and technology which have tapped vast new sources of the material things necessary for the purely animal side of human existence, the situation is much the same as it ever was, for nearly two-thirds of the human race is undernourished. World population, so say the statisticians, will double itself in forty years. Where is all the extra food to come from? In theory the resources of the world are more than sufficient to support such a population increase; the big question is, can those resources be developed quickly enough to keep pace with human needs?

Before this question can be answered, it is necessary to look at some basic facts and discard certain prejudices which seem to blind many who come forward with suggestions to solve the problem. In the first place, the fundamental problem is not nutritional but economic; the prime cause of hunger is poverty. The teeming masses who live at or below subsistence level do not eat enough because they cannot afford it. Let us take a look at two countries on opposite sides of the economic fence, India and the United States. The population increase of the United States is actually greater than that of India, being 1·8% per annum compared with India's 1·3%, yet the former's living standards are rising all the time, which indicates that undernourishment is not always caused by an expanding population. Neither is population pressure really a root cause of the problem, for the population density of some west European countries, notably Britain and Belgium, is higher than in, for example, Thailand and Viet-Nam, yet the level of food consumption is much greater in the former than in the latter. All the economic surveys carried out by U.N. organisations have shown that undernourishment exists in those countries where average incomes are low and not necessarily in those countries having high population statistics.

A confusing factor is the belief held by many of the desirability for self-sufficiency. In the order of things this is not possible. Some countries produce food surpluses, others make up deficiencies by imports. Could Britain have attained her present high standard of living and highly industrialised economy if she did not import heavily? The same is true of some other European nations. It is in those countries where food production is insufficient and purchasing power inadequate to cover the gap between demand and supply that undernourishment is a problem. The world problem is one of balancing total demand with total supply, and this can be done if, in the words of the declaration of the Hot Springs Conference of 1943, there is "full employment in all countries, enlarged industrial production, the absence of exploitation, an increasing flow of trade within and between countries, an orderly management of domestic and internal investment and currencies and sustained internal and international economic equilibrium." The food which is then produced can be made available to all people.

The ultimate wealth of nations is the work of human hands and brains. Advocates of birth control to solve this problem miss the point completely. We do not always agree with the pronouncements of Russian leaders, but we wholeheartedly agree with Mr. P. M. Chernyshev, deputy leader of the Russian delegation to the conference of the Economic Commission for Asia and the Far East, when he told the conference: "The key to progress does not lie in limitation of population through artificial reduction of the birth rate, but in the speedy defeat of the economic backwardness of these countries." Even in this jet and space age, the earth is a big place, and Nature a bountiful mother if her designs are not frustrated by the ignorance and stupidity of men.

When is a mushroom . . . ?

THE case recently dismissed by the Chichester magistrates, in which the prosecution alleged that Anglo-Swiss Products, Ltd., supplied for sale mushroom soup which in fact contained no mushrooms, brings to mind the thought that as long as we are satisfied with what we are eating then there is no need to worry about what we consume. The magistrates ruled that the fungus *Boletus edulis* was in fact properly described and allowed the firm 100 guineas costs against West Sussex County Council. Similar summonses against the Nestlé Co., Ltd., Batchelors Foods, Ltd., and W. Symington and Co., Ltd., were

adjourned *sine die*. The summonses were brought under the Food and Drugs Act.

Mr. Anthony Harmsworth, for the prosecution, said that the contents of a packet of *Knorr* were examined and it was found that what was stated to be dehydrated mushroom was dehydrated spores of the fungus *Boletus edulis*. He described this fungus as different in character from the mushroom and went on to say that it could not properly be described as mushroom either in the botanical or commercial sense. Mr. F. H. Lawton, for the defence, produced a Latin dictionary and said: "Boletus means this: 'The best kind of mushroom.'"

"I recognised the flavour," said Dr. John Ramsbottom, formerly Keeper of Botany at the British Museum, who had eaten soup made from *Boletus edulis*.

Surely a testimonial worthy of note was that of Mr. Kenneth Symington (managing director of Symingtons) who said that dehydrated cultivated mushroom seemed to lose practically all its flavour.

In view of the foregoing, we rushed to the Shorter Oxford English Dictionary and found that the position was not made much clearer for "Some apply *mushroom* to the edible fungus and *toadstool* to the poisonous." What is in a name as long as the customer is provided with a wholesome product and is receiving value for money? Surely, it may be argued, the simple way round the whole question would have been to label the soup packet and name the variety of mushroom used. No complaints have been heard from the customer.

A correspondent writes that in its narrower sense the term mushroom certainly suggests the wild or cultivated *Agaricus campestris*, but in a more general sense the word has of course often been applied to any edible fungus. In fact, there are many precedents for using "mushroom" in an even wider sense; witness the excellently illustrated small book issued by the S.P.C.K. in 1894, with the title "Edible and Poisonous Mushrooms," by M. C. Cooke.

Boletus is a popular fungus throughout Europe, being gathered in woodlands and not artificially cultivated. On the lower side of its bun-shaped cap, the spore-bearing surface lines vertical tubes, thus giving an under surface with pores instead of the radiating gills of *Agaricus*.

The tubes tend to form a happy hunting ground for small beetles and other insects, and when *Boletus* is freshly gathered for eating, it is customary to remove the spore-bearing tubes before cooking. In view of the occurrence of insect fragments in many samples of imported mushroom powder, one would like to be assured that this practice is followed in the preparation of the dried product.

Waste—by order?

LAST January in these columns we commented on the dismay felt by Australian dairy interests at the growing sales of a skim milk product containing added vegetable fat, known as "filled milk." The product has since been banned in Australia, and in this country Government regulations are now proposed which would require filled milk products, and beverages containing it, to be labelled "skim milk with added fat."

We have recently received a pamphlet published by L. E. Pritchitt and Co., Ltd., entitled "Waste—by order!" which deplores the proposed regulations and says that they will do serious harm to the filled milk trade, claimed by this pamphlet to be a "vital" one. The cover of this document carries a picture of a churn of milk being poured on to the ground, and the general tenor of the pamphlet is that filled milk is made from skim milk which would otherwise be wasted, even to the extent of being used for "mere animal feeding" (!) Some of the statements in this curious publication are rather extraordinary. It opens with a real tub-thumping blast: "The regulations . . . would paralyse a new and thriving British industry, and would throw into unemployment those now engaged . . . They would strike at the pockets of the people. They would deprive the public . . . of a nourishing and popular item of everyday diet. They would curtail a product which is a guaranteed stand-by in times of milk shortage." After commenting that observance of the publicity campaign to drink a pint of milk a day would cost a family of five 23s. 4d. a week, it goes on to say: "the average working class family cannot possibly afford this expenditure for one item of food. Are we to deny the lower income groups an alternative cheaper food, with approximately the same nutritive value and palatibility characteristics, simply to pander to the prejudice of the dairy interest?" In the words of the aforesaid "working class family," come off it! The toiling masses are not so poor as they were. As for nutritive value, we would like expert opinion before feeding our children with a product not, at present, subject to any Government regulation.

We presume that one purpose of the proposed regulations is to prevent the possibility of filled milk being consumed in the assumption that it is real milk. If Messrs. Pritchitt are right in saying that filled milk is becoming widely used in industrial canteens and the cheaper restaurant and hotels, we are sure that not all the patrons of these establishments are aware of this. How many, we wonder, would approve? The public have a right to know what they are consuming. Filled milk sales can only increase at the expense of real milk, a staple item in the nation's diet. If the threat of unemployment is used as an

argument, who has the greater grievance, the members of a new, very minor and largely artificial trade or those in a large, old-established and vital industry which has served this country very well for many years? If filled milk has a place in our economy, it must be a fair one. Messrs. Pritchitt demand that justice be done; we suggest that their cause could be stated in a far better way than in the manner set out in this pamphlet.

More about glucose

WE have been mildly chided for our comments (April, 1959, p. 139) on the report of the Food Standards Committee concerning soft drinks, especially for our remarks about glucose. We have been shown (not that we were unaware of them) articles in the medical press describing the therapeutic qualities of glucose. Now we do not propose to cover all over again ground which has been already bitterly fought over. The medical value of glucose, be it dextrose monohydrate or the liquid glucose of industry (which are not quite the same things) is quite beside the point. The point we wished to make was the fallacy of extolling the virtues of glucose on behalf of certain soft drinks which do not contain enough of it to have any appreciable effect. The argument need not be taken further.

Corrosion comes to Town

SPEAKING so soon after the announcement of tax changes in the Budget, Sir Owen Wansbrough-Jones, Chief Scientist of the Ministry of Supply, struck a topical note when he remarked at the opening of the Corrosion Exhibition that the cost of corrosion to this country was equivalent to 2s. in the £ on the standard rate of income tax. This was based on the widely-quoted estimate that corrosion costs Britain £600 million a year, an estimate that Sir Owen found slightly unbelievable but which, so far as we know, has not been challenged.

Whatever argument there may be about the magnitude of corrosion costs, there is no doubt that corrosion does a great deal of damage in more subtle ways than direct destruction. It is responsible, for instance, for losses in reliability, extra wear on mechanical equipment and extra costs of maintenance. Sir Owen thought that scientists might well give more attention to the maintenance of reliability by proper corrosion prevention.

Sir Owen praised the organisers of "this large and admirable exhibition" and, indeed, his description of it was strictly accurate, for it was probably the biggest exhibition of its kind ever to be held in Europe, perhaps in the world. The New Hall of the Horticultural Society in Westminster was packed with the displays of some 80 exhibitors and the large and keenly interested attendance convincingly demonstrated that the exhibition has made a permanent niche for itself in the calendar of technical exhibitions.

The exhibitors—large and small—deserve praise for their skilful exposition of the gospel of corrosion technology, and it is clear that there will be keen interest in the next exhibition which, as in the case of the 1957 and 1959 shows, will be organised by our associated journal *Corrosion Technology*. Firms wishing to participate in the next exhibition will be advised of the time and place and all enquiries should be addressed to *Corrosion Technology*, 9 Eden Street, London, N.W.1.

Skim milk for pigs

AS has been pointed out before in these columns, feeding livestock with poor quality feedingstuffs is false economy, because the quality of food eaten by farm animals has a direct bearing on the quality of the food we obtain from them. It has been proved by experiment and practice, so we are informed, that skim milk is an excellent food supplement for pigs of all ages, and is economic provided it can be bought at a reasonable price. The Harper Adams Pig Husbandry Experimental station carried out two series of experiments last year. In the first, pigs were fed a diet in which the normal protein of fish meal and soya bean meal was replaced by one gallon of skim milk per day. The results indicated that this amount of skim milk more than supplies the pig's protein requirements and appears to improve the efficiency with which the rest of the food is utilised, and is also an economic proposition.

The second experiment was a comparison of the effect on growth rate and food utilisation of different amounts of sweet separated milk and of sour separated milk. It was found that up to ¾ gal. of sweet or sour separated milk per day had beneficial effects, but above this amount no further increase in growth rate was achieved, so that there is no point in feeding more than this amount. Neither is there any point in feeding sour separated milk, since volume for volume, sweet and sour are equivalent and the former is easier to handle. The most economical amount to be used can be decided by the producer only by knowing the prices of separated milk and other protein foods, and if supplies of the former are limited, a daily supplement of half a gallon of skim milk per day, which the experiments showed produced results similar to the standard meal ration at the Harper Adams Station, might well be a very economical proposition.

A sacred ritual

THE appearance in the tea packets of J. Lyons and Co. of picture cards is only one of several signs that competition in the tea trade is becoming extremely keen, a state of affairs confirmed by the intensification of T.V. and press advertising by all the major and some smaller companies in the business. The amount of tea consumed by the ordinary Briton is unmatched anywhere, and outside the Communist world the U.K. is the largest market for tea, total consumption last year being about 518 million lb., or 10·03 lb. a head. Such phenomenal consumption is an indication of the place held by this beverage in the British way of life. So entrenched are the tea drinking habits of the British that innovations such as tea bags and, a recent appearance abroad, instant tea, have glanced off the armour of our national conservatism. There is only one method of making tea, of which we are unashamedly a devotee. Tea making is a sacred ritual, to be set above all other processes. Whatever the advances of technology, whatever new forms our food may take, from this ritual we will not budge. It is hallowed by generations of tea drinkers, its form unalterable and exactly defined, its instruments timeless. You need a kettle and an earthenware teapot, a cup, saucer, and spoon. The kettle must be filled with water and brought to the boil, but only just. Immediately the teapot must be warmed with a little of the boiling water which is swilled and thrown away, and then at once into the pot is put a teaspoonful of tea for each imbiber and one for the pot. The pot must then be filled with the water from the kettle, stirred and left to stand under a cosy for three minutes, no more, no less. Sugar and milk may be left to individual taste, also you may put your milk into the cup first or last, which ever you prefer, but from the foregoing routine there must be no divergence.

To our home readers we apologise for outlining a process so familiar that, like the British Constitution, it were better left unwritten. But it is stated baldly for the edification of our overseas readers, of which there are many, and whose travesties of our beloved beverage we have more than once had to endure. Some of the horrors perpetrated are hardly believable (let it be whispered with awe that we have known of attempts in the U.S.A. to make "tea" by using hot water from the tap!) So, dear overseas reader, before you scoff at our rigid tea drinking habits, remember that it is an institution. "Everything stops for tea," and rightly so. The Russian likes his tea in a tall glass with a slice of lemon floating on the top; we concede that the beverage taken in this form has a certain fascination. But to the Briton nothing replaces the "cup of tea" and never will.

On writing

DEAR reader—do you want to write for FOOD MANUFACTURE? If so, an article of from 1,000 to 3,000 words, a news item of world interest, a comment on food matters, or even a contentious letter is acceptable for publication, provided that the material is based on first-hand knowledge or experience, is of sufficient interest to our readers, is carefully prepared, and attractively presented. It must be expressed in plain English without the affected use of abstruse terminology and without padding. Photographs, drawings, or diagrams are very desirable, but beware of including tables if they are merely an uninformative mass of figures. A table should only be included to assist the text.

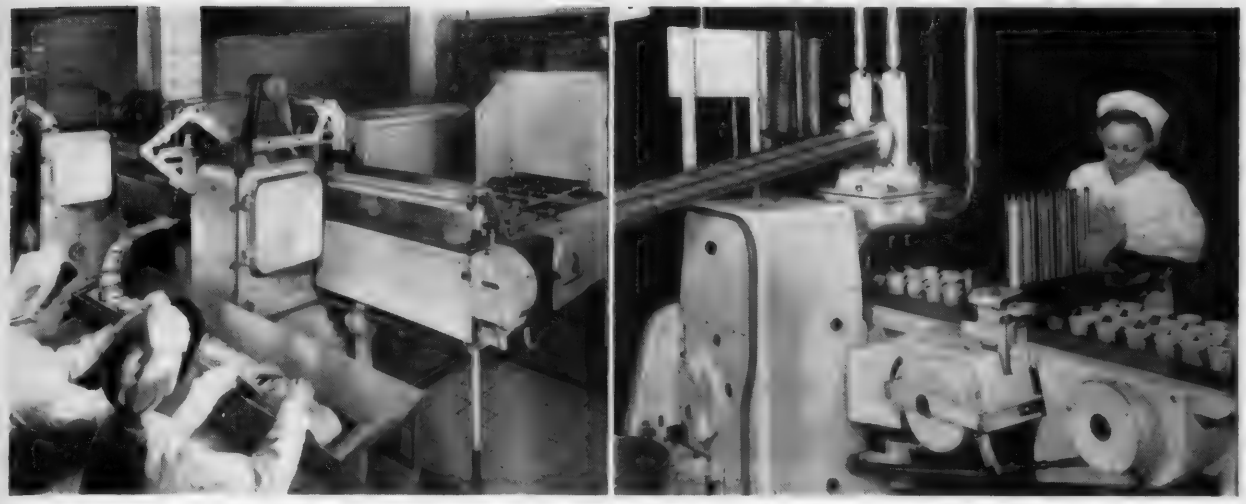
There are many who have something interesting and useful to write about and don't know how to begin. Provided that the principles of grammatical expression are understood, the only way to learn writing is to write. At school, our week-end essays were invariably returned with the comment: "A good effort, but do again," and so in those days we learned the hard way. So don't be too disappointed when "The editor regrets . . ."

To some of our readers, English is a second or third language, and they cannot be expected to express themselves in perfect English. If the material is good, the editor can, within reason, correct faulty expression, provided that the typescript has wide margins and ample room for corrections. We particularly welcome authoritative articles from countries overseas.

Roughly speaking there are two types of article, the factual and the inspired. An idea is born; it may be meditated upon for weeks; observations, investigations, reading, and research may be required; and finally, when conclusions have been reached, the article is written. Occasionally, its final form may take shape at once, but this is unusual; like a work of art, it must be carefully shaped, corrected, altered, refashioned, until in its final version it is the exact expression of what the author wants to say.

The good writer does not work office hours. The average daily task of creative writing or typing is about four hours a day, but beyond this period the author may be developing his theme in his mind at any time of the day or night. In four hours, he does well to produce 2,000 words. Some writers find expression only when the mood is upon them, others work remorselessly to a set time-table. It is difficult to lay down hard and fast rules for this intensely individualistic method of self-expression.*

* Read *Writers at Work*. Secker and Warburg, 1958. Obtainable through Technical Books, 308, Euston Road, London, N.W.1.



(*Left*): **Choc bar enrobing machine and wrapping machine.** (*Right*): **Cups being filled and capped.**

How Eldorado make Ice Cream

Continuous manufacture by automatic machines

No longer regarded as a sweet for hot days but as a nourishing year-round food, ice cream continues to gain popularity. In a recent visit, FOOD MANUFACTURE saw the latest automatic machines used by one of Britain's leading makers.

THE foundations of the Eldorado Ice Cream Company go back to 1922, when on the site of the present large factory in Stamford Street, London, S.E.1, was built an ice-making plant designed to produce 1,000 tons of ice per day. Shortly after commencing operations, when production had reached about 300 tons per day, this project received a severe blow by the appearance on the market of a small automatic ice making plant; the management decided to switch production to ice cream, although ice making was also continued, even to this day. The ice cream business was started in 1924 under the name of the Pure Ice Cream Company; starting capital was £5,000, and the sales during the first six months totalled £2,800. The manager was S. W. Alexander, who died last year in his 79th year. At the time of his death he was still in office.

When they began operations the company had two batch freezers, each of 100 quarts capacity; now ice cream is made in batches of 500 gallons at a time at the rate of many thousand gallons a day. The company were the first in the world in 1932 to introduce the continuous extrusion process; today, although initial mixing of ingredients is performed batchwise, production is otherwise fully continuous and automatic. At the present time, new machines are being installed to increase output and to raise even further the level of mechanisation.

Refrigeration

The factory occupies an area of over one acre; there is room for further extension when the time is ripe. There are two floors below ground level, and the cold storage floor space totals six acres. The two engine rooms for the refrigerating plant contain 18 first stage and 14 second stage compressors, and cooled ammonia is circulated to the cold rooms, hardening tunnels, and production lines. At convenient points, tanks of cooled brine are used for cooling. Temperatures in the cold rooms are kept between −15 and −20°F., and in the tunnels between −40 and −45°F.

Preliminary mixing

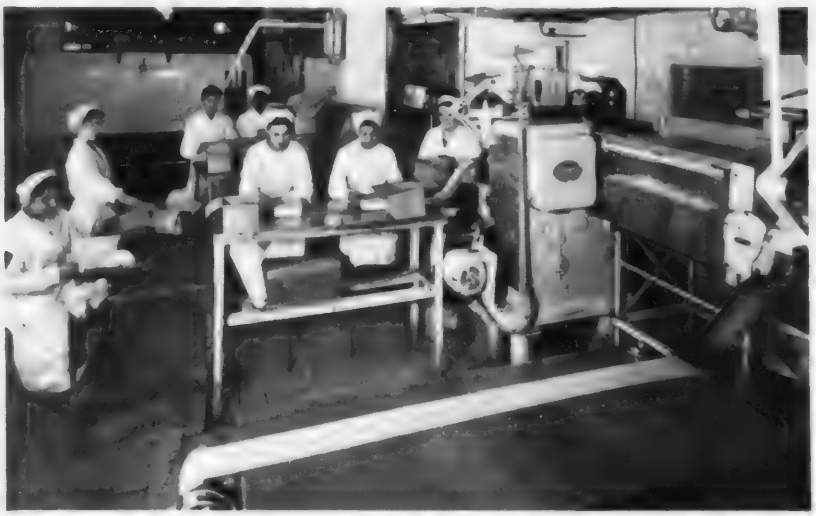
Two ranges of ice cream are made, the standard product made from vegetable fat, and dairy ice cream, marketed under the name "Velvet Lady," made from butterfat. The essential ingredients of ice cream are fat (milk or vegetable), sugar, milk powder, eggs, flavour, stabiliser, and emulsifiers; these are weighed and brought into solution in 500 gal. stainless steel mixing pans. The mixing is effected by special methods which the company say

have an important influence on the final flavour.

The creamery

From the pre-mixing tanks the liquids are pumped to four 500 gal. stainless steel blending tanks in the creamery on the floor above. The blended ice cream, after being pumped through C.P. Equipment filters, then passes to 6 enclosed pasteurisers where it is held at a temperature of 155°F. for 30 min. It is then pumped under high pressure through three homogenisers, the homogenising valves of which consist of small conical plugs each made of one continuous strand of stainless steel wire tightly compressed. The product then passes through three plate coolers to four 2,000 gal.

A general view of the creamery, showing in the foreground the blending tanks, in the middle distance the pasteurising and homogenising tanks, and in the background the 2,000 gal. storage tanks.



After passing through the hardening tunnel, the ice cream is portioned and wrapped in this Turner automatic bricquette wrapping machine.

ammonia-jacketed ripening tanks, where it is kept for some time at 40°F. to mature.

After maturing, the product is pumped by A.P.V. pumps to the storage tanks on the floor above, from which it is drawn off as required. A battery of continuous freezers process and extrude it on to 9 endless stainless steel bands running on rollers, which take the extruded ice cream through the nine 60-ft. hardening tunnels subjected to a temperature of −40°F.

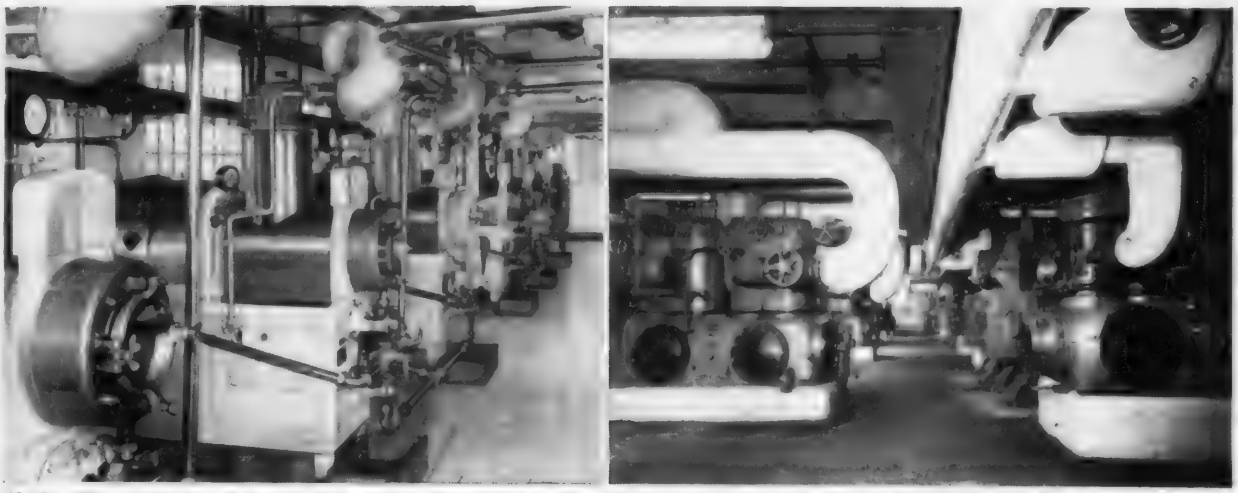
Portioning and wrapping

On emerging from the tunnels, the hardened ice cream is portioned into briquettes and bars by automatic machines made by the Turner Automatic Machine Co., Ltd. Briquettes are wrapped automatically by Turner wrapping machines, while for chocolate coated lines the portions pass through a Bramigk enrober before wrapping.

The company manufacture more than 200 different varieties of product. Each line is available in both standard and dairy ice form, and in various flavours, such as vanilla, strawberry, chocolate, coffee, and many others, and in combinations of these. Besides briquettes and bars, ice cream is sold in paper cups (filled and capped automatically by machines made by Kustner Bros. and Co., Ltd., and by Rose Bros., Ltd.). Also made are ice lollies and gateaux.

Ice lollies

Lollies are made by the continuous filling of steel moulds which pass by conveyor through cooling tanks of chilled brine to automatic wrapping machines. Each mould accommodates 24 lollies, and is filled by a *Bexuda* filling machine made by Equipment Repairs, Ltd. The wooden sticks are incorporated by a special machine made by Vanmar Products, Ltd., which loads 24 sticks at a time into the stick holders as they are presented to the machine by hand, and which are then placed on the moulds as these come from the filler. The moulds with stick holders in position then pass by conveyor through tanks of cooled brine at a temperature of about −10°F.; this is coloured deep blue so that any leaks in the moulds are at once seen. At the end of the brine tanks the stick holders are lifted automatically from the moulds; the hardened lollies suspended by their sticks are lifted too and pass to a wrapping machine designed by the Eldorado company. In this machine the lollies are dis-



(*Left*): **The continuous freezers from which the cooled product is pumped to the extruders.** (*Right*): **Some of the ammonia compressors in the engine room.**

tributed over a number of chutes into which they are released by an ingenious gate mechanism; they drop into paper bags at the bottom of the chutes which are kept open by air jets. The weight of each lolly carries away the bag, which is immediately replaced by another. The wrapped lollies fall on to a moving conveyor from which they are taken by hand and packed into cartons.

At the present time the lolly production line is being enlarged by the construction of a completely automatic plant by Rownson, Drew, and Clydesdale, Ltd.

Gateaux

In the gateaux making department we saw elegant examples of the confectioner's art being made. Besides a standard range of decorated ice cream gateaux, specially decorated products are made to individual customers' requirements; these may include wedding and birthday gateaux, and gateaux for special occasions, which are decorated with coats of arms, intricate coloured patterns, and tableaux made in sugar confectionery.

Dispatch

The normal day hours of working are augmented when demand is heavy by a two-shift system. There is always a cleaning shift in addition. Distribution to the company's depots all over the country is by insulated rail cars,

A craftswoman putting the finishing touches to an ice-cream gateau. Besides a number of standard lines, special gateaux, some of them very elaborate, are made to order.

of which there are two types, one refrigerated by solid carbon dioxide and the other, a newer type, which is refrigerated before loading by means of portable refrigerating units; the refrigeration process takes about 8 hr., and is carried out in the company's vehicle park.

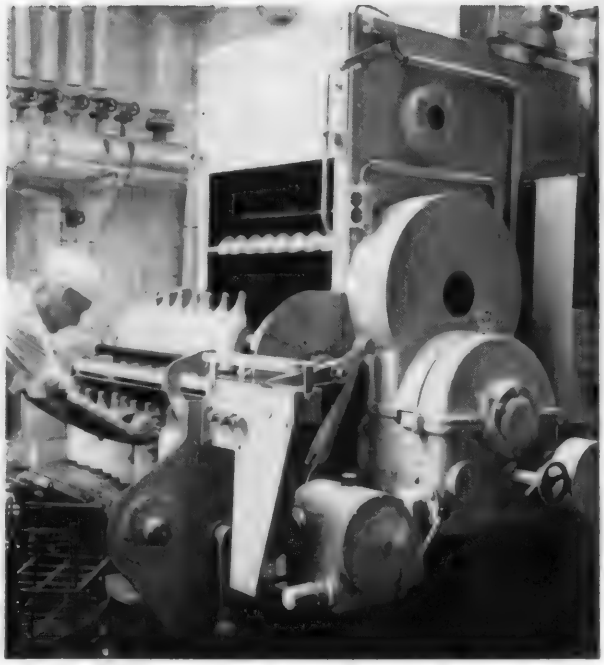
Ice cream is no longer regarded merely as a sweet; it is also a most nourishing food. The war-time Minister of Food did a great if unintended service to the ice cream industry when he rescinded the restrictions on the manufacture of ice cream on December 15, 1944; on that bitterly cold day, with snow lying on the ground, the public flocked to buy the ice cream which they had not seen for two years, and discovered that it was just as pleasant to eat in winter as in summer. Thus ice cream ceased to become a summer delicacy and became what it now is, taken for granted all the year round. As one of the top three makers in this country, Eldorado have reason to be proud that for them every year has been better than the last, which held good even during the atrocious summer of last year.

Milk Puddings

Their Industrial Production

By R. Rutgers*

Milk puddings are produced industrially on a bigger scale abroad than in this country, especially in Holland, but are finding an increasing market here. This article describes Dutch practice and discusses the properties and requirements of different types.



CEREAL-MILK mixtures are excellent foods, having a good balance of nutrients, not only of proteins, amino-acids, fats and carbohydrates, but also of those other nutrients present in small quantity but vitally necessary, vitamins and minerals. Milk puddings are a means of persuading people to consume milk, as they can be had in a range of tastes and consistencies; they can be eaten at breakfast, taken as a sweet, or used as a light evening meal.

The housewife can prepare these puddings at home, but it is of great advantage to her to buy them ready made. She then gets them as instant meals of a quality possibly better than can be obtained in the kitchen. As for cost, a well-equipped factory can produce these puddings at low price.

As a rule, cereal-milk puddings and porridges are made industrially at milk-product factories and not by the cereal industry, and are retailed by milk dealers. Stocks are kept at the factories in cold store at about 7-10°C. Usually the products are consumed within a week or two after production, and microbiological keeping qualities should be adequate for this rather short shelf life. In Holland, the porridges are filled into ½ and 1 litre bottles, which are returned to the milkman when empty. Waxed-paper cartons are not used, as they are for milk. It is not the practice in Holland to can and sterilise these products.

We shall call these products indiscriminately puddings, porridges or gruels. They are probably not true British porridges, as they are homogeneous and not made from a thick porridge with thin milk or cream on top. They can, however, be eaten this way if they are manufactured in a thick consistency, and more milk added before eating. These products sometimes are warmed up before consumption, but they can be, and often are, eaten cold.

The consistency of the products varies with the type of cereal and with local preference, and must be such that they can be poured (after shaking) from a wide-necked bottle. They should not be very gelatinous; rheologically speaking, the yield value should be low. All these gruels show some thixotropy; on stirring they become thinner, but should not become too thin. Their viscosity should not change too much on shaking, stirring or warming up, and their consistency should be maintained throughout their shelf life. This goal can be difficult to attain, as starchy gelatinised solutions tend to change in consistency. Separation of thin fluid, or wheying-off, especially should not occur.

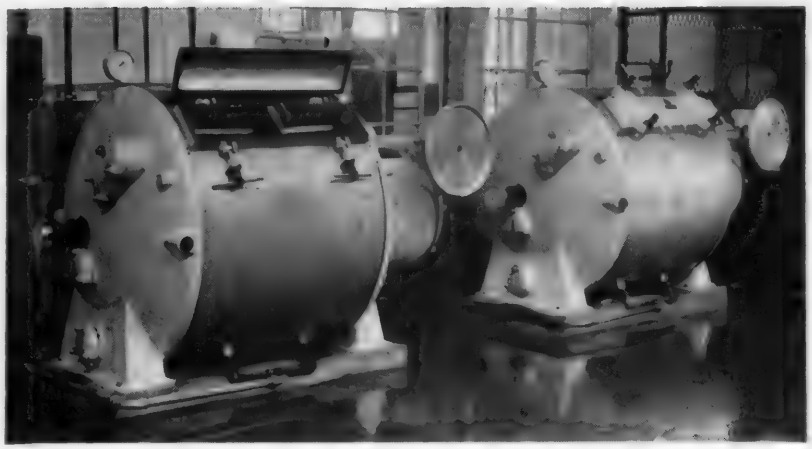
The puddings are made from buttermilk and sweet milk, and from different kinds of cereals and starches. Some types combine well with one another, such as buttermilk and barley, and sweet milk and maize starch.

Production

Production methods vary with each type of pudding, but a general process can be described. The materials are cooked in stainless steel vessels usually of 1,000 litre capacity, although other sizes from 250 to 3,000 l. are also used. The vessels are provided with jackets through which steam and cooling water can be alternately circulated, and with variable speed stirrers. Adequate stirring and strict temperature control are important. In buttermilk preparations the curdling should be kept very fine; whole grain kernels must not be allowed to settle, and fine starch slurries must be kept homogeneous while gelatinising.

* N.V. Koninklijke Pellerij Mercurius V/H Gebroeders Laan, Wormerveer, Holland.

(Above): **A continuous steriliser for milk and milk products at N.V. Stork, Amsterdam.**



Rotating sterilisers for bottled milk products at N.V. Stork, Amsterdam.

Overheating of the milk at the walls must be prevented, as this would spoil the colour and taste of the product. Too rapid stirring is undesirable, as then the grain kernels and the gruel structure might become too disintegrated, and foaming might also occur.

The illustrations on page 239 show a cooking vessel with overhead drive and the interior of a vessel with under drive of a special form and with an inner cylinder for more rapid heating or cooling.

The milk must be of good quality, as a poor grade gives a porridge of inferior taste. The sweet milk used is pasteurised, although it is afterwards cooked. The cereal is often added as a thick slurry in cold milk to milk heated to 95°C. Cooking is done as a rule at 90-98°C., preferably at 93-95°C., for a time varying with the cereal, from 5 minutes to 4 hours.

Filling

After cooking, the products can be filled directly into bottles, but usually they are cooled somewhat to between 75 and 45°C. by circulating cooling water through the jacket. The higher the filling temperature the better the microbiological quality; there is, however, an upper limit to prevent breakage of the bottles. Some products improve in consistency by being cooled with stirring before being bottled, but there is a lower limit because of the greater risk of infection and the increase in viscosity which makes filling difficult.

The filling machines are often the same as those used for filling milk, but with special interchangeable filling valves adapted to the type of porridge. Clogging of the filling tubes must be prevented. There are many types of filling machine, for wide and narrow mouth bottles, for cap or cork closures, for vacuum or gravity filling, and for a combination of any of these. Illustrated on page 238 is a combined filling machine.

After being filled, the porridge is never sterile, although it is possible to limit the bacterial count to some hundreds per gram. Quick cooling of the filled bottles is therefore important, and this is done by placing the bottles in a cooled room or in cold water, or by spraying them with water of decreasing temperature. Below 0°C. freezing would occur, and subsequent thawing would destroy the starch structure and impair the consistency, so a keeping temperature of 7-10°C. is often used.

Pasteurising

It is possible in limited areas to produce, bottle and distribute puddings in this way without microbiological deterioration, especially in winter. But with longer distribution times and greater shelf life in hotter weather, keeping qualities cannot be guaranteed in this way. Sweet milk porridges tend to spoil much quicker than buttermilk products, and pasteurising of the filled bottles is often necessary. Cooling is therefore not necessary, and the bottles can be pasteurised directly after filling. Sterilising of cereal-milk products is much more difficult than that of simple milk. The heat transfer through the viscous mass is rather slow, and long heating times or higher temperatures are required. In experiments with 4·2% maize starch milk puddings heated in test bottles of 5·3 cm. diameter from 70°C., in an autoclave at 115°C., we found the temperature in the heart of the bottle to be 103°C. after 20 minutes and 110°C. after 40 minutes. On keeping such bottles at 25°C. for 3-5 weeks, we found some bacterial decomposition in product pasteurised for 20 mins. at 115°C. and none in those pasteurised for 40 min. With rolled oats puddings in sweet milk, the sterilisation is more difficult still, *e.g.* some deterioration began after 4 days at 25°C. in product sterilised at 115°C. for 20 min.

High or long heating, however, impairs consistency, colour and taste. Therefore cereal milk products are more generally pasteurised than sterilised. Heating conditions vary from product to product, but heating in chambers for 30 min. at 105°C. is frequently used, although higher and lower temperatures and times are often applied. Use of rotating sterilising equipment is an advantage. With more vigorous heating with agitation of the bottles, some of the cooking can be done at this stage. A continuous and a rotating steriliser are illustrated.

Even if the porridge has been cooked for a long time with stirring, so that the starch has gelatinised completely, these starchy milk products often become thicker under pasteurising and much thicker under sterilising conditions. It should be remembered that the determining properties for the consumer are those of the product that has been kept cool for some days. The properties of the hot cooked product may be correlated with those, but a "hot paste viscosity" is not important in itself for the consumer.

It will have become evident that industrial production makes spe-

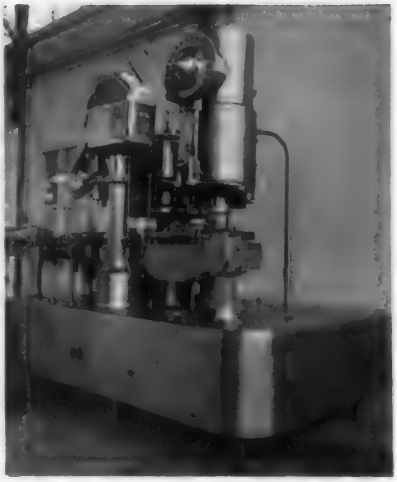
cial demands compared with preparation in the kitchen. While the cold consistency should be as desired, the hot porridge must fill at a reasonable velocity, but the hot paste consistency must not be too low because the bottles usually stand for some hours at the cooking and pasteurising temperature, and during this time the grain kernels must not settle. The difference between the hot and cold consistency must therefore be rather smaller than for the kitchen product, and to achieve this the cereal or starch concentration is lower and the cooking time much longer than is the rule in the household. A consequence is that the porridge is not so much cooked until done, but until the required combination of hot paste and cold paste consistencies and prevention of settling are reached.

We will now discuss more specifically some different types of cereal-milk products.

Barley-buttermilk pudding

A barley-buttermilk pudding made with 6-7% barley can be cooked to a rather thick porridge of light colour and good taste. It is very difficult to prepare this type of pudding of a good quality in the kitchen. The porridge must be creamy, contain intact large swollen barley kernels that do not settle; the buttermilk should stay finely curdled and no wheying-off should occur on keeping the product. As the preparation of this porridge takes 1-4 hours, it is clear that this is very difficult to do by hand-work unless much more barley is taken. The taste of this product can be excellent, as barley and buttermilk go very well with one another. As a rule no sugar is added at the cooking.

The buttermilk used for the barley-soup should have an acidity of 80-95°D. Acidified skimmed milk can be used, but this mostly gives a product of somewhat lower quality (more curdling), and the acidification should be done carefully and at a low temperature. The barley used is pearled moderately after dehulling and should not be too coarse, as colour and binding capacity are then lower.



A bottle filling machine which can fill wide mouth bottles with caps, and narrow or wide mouth bottles with cork closures, at N.V. Marja, Utrecht.

A very fine pearled barley is not suitable, as it gives kernels which are too small after cooking. The barley variety has very much influence on the thickness of the porridge or on the cooking time required to obtain the desired consistency. With ordinary milled barley this time can vary from 2½-5 hours, and 3-3½ hours is a good average. With barley of low binding capacity the kernels are done after a shorter time, but the consistency of the porridge is then still insufficient. The cooking time can be decreased somewhat by steeping the barley in water for ½-1 day. A shorter cooking time keeps the colour lighter.

The cooking is done in the vessels previously mentioned. The most important part is the warming-up. This should be performed at such a rate and with such stirring that the buttermilk does not curdle coarsely. Such curdling tends to occur mostly at 40-65°C., and a coarsely curdled buttermilk causes slower thickening, poorer colour, unattractive appearance generally and wheying-off on keeping. It is best to start slowly, but to pass the critical region rather rapidly, especially if stirred vigorously. Above 70°C. the risk of further coarse curdling is considerably diminished. The barley should be present from the outset, as it protects somewhat against the curdling, although not yet cooked at all. The cooking is completed at a temperature of 93-96°C.

Special filling valves are necessary for bottling this type of product with large swollen kernels. The product, being acid, keeps for days or even more than a week, depending on the keeping temperature. Therefore it is not usually pasteurised.

As cooking times with the ordinary types of barley are rather long, with risks of deterioration in colour, taste and consistency, a new product has been introduced, *i.e.* quick-cooking *Lassie* barley. By a process of precooking and pressing a product is obtained requiring a much less cooking time, *e.g.* ¼-½ hour. For the industrial cooking of the buttermilk-barley porridge, a product of good hot and cold consistency can be obtained with 1 hour cooking instead of 3-3½ hours for untreated barley.

Rolled oats milk porridge

This porridge is nearly always made with sweet milk, sometimes with sugar added. In this case about 2% on the milk is sufficient, which is low in comparison with, *e.g.*, maize starch pudding, where 6-7% sugar is added. Rolled oats need much lower sugar addition for optimum taste, owing to their own full-bodied and well-rounded flavour. The addition of some salt improves the taste somewhat.

The industrial preparation of this rolled oats product uses quite different conditions than is the custom in the household, either in Britain or in Holland. Using the until now most common type of rolled oats, the so-called quick-cooking variety, a cooking time of 3-5 minutes is required for a well-done household product. In Britain this product is often prepared by cooking 20-25% of oats with water, and eating the very thick paste or pudding diluted with milk or cream and sugar. In Holland a gruel is prepared by cooking 8-10% of rolled oats with milk for 3-5 minutes, and eating this product as such after some cooling and addition of sugar. This "porridge" has the consist-

Stainless steel vessels of the type mentioned in the text for mixing cereal-milk puddings. (*Left*): With stirrer underdrive and cylinder for heating and cooling. (*Right*): With overdrive. Both vessels are made by N.V. Machinefabriek.

ency of a very thick liquid with flakes, or of a thin pudding.

In industrial practice, 5·5-6·5% of quick-cooking rolled oats are cooked for 30-45 minutes at 95°C. The reason for this long cooking time for a quick-cooking raw material is that the filled bottles stand still for considerable times at higher temperatures on cooling or on pasteurising and cooling. Cooking in a concentration of 9-10% for 3-5 minutes gives a product that does not show settling on standing, but which has a consistency after cooling which already makes difficult the removal of the contents from the bottle. After pasteurising or sterilising, however, the material becomes so thick and even rubbery that it practically cannot be removed at all from the bottle. With 8% rolled oats and 5 minutes' cooking time, settling on standing hot does occur, but the thickening after pasteurising is far less severe. Now with 5-7% and cooking for 30-40 minutes, a product is obtained that does not settle on standing and for which the increase of viscosity on pasteurising is low enough (though occurring still to some extent) to make ready removal from the bottle possible after cooling.

A consequence of this long cooking time whilst stirring is that the flakes get finer and the structure of the porridge is more homogeneous than for a product cooked for 3 minutes.

The microbiological keeping qualities of this sweet milk oats product is low indeed, and often pasteurising is necessary. This is, however, difficult to perform, and sterilising still more so. The heat transfer through the mass is very slow, and too long or too high heating worsens colour and taste of the product. It is possible to use 30 minutes at 105°C. or about 15 minutes at 110°C. The product should be kept as cool as possible, preferably even below 8°C.

Quick-cooking rolled oats are mostly used, made from cut oat kernels. Sometimes so-called normal cooking rolled oats, made by rolling whole oat kernels to a thicker flake, are still used. Whilst the ordinary cooking time for this type is 5-10 minutes, a cooking time at 95°C. of 60 minutes is needed in the industrial process, using the same concentration as for quick-cooking oats. Furthermore, the instant rolled oats product, *Lassie*, requires no cooking at all in the household, but in the industrial process 5-10 minutes and some pasteurisation. With this product it is possible to use buttermilk too with oats. Then the instant properties of this instant oats product appear fully and it is possible to make a porridge or gruel without any heating at all, by stirring 8-9% into cold buttermilk for 5-10 minutes and filling into bottles. The product has the same keeping qualities as buttermilk itself.

Starch-milk pudding

This product is made with sweet milk by cooking with 4·0-4·7% starch (often 4·2%), mostly maize starch, and about 6-7% sugar (sucrose). Some yellow colour and a vanillin-base flavour are added. Other flavour-types are possible, *e.g.* caramel and butterscotch. Some salt, ½-1% on the

starch, can be added to enhance the flavour. This type of starch-milk pudding should have a rather narrowly defined consistency. It should not be a stiff gel, but may be somewhat gelatinous. After some shaking it must be possible to pour it slowly from the bottle, without lumpiness. On the other hand, it should not become a thinner liquid after shaking. Wheying-off on keeping the cold product, caused by syneresis and starch-retrogradation, should not occur.

As the puddings need to keep the described properties for some days at room temperature or lower, and even for 1-2 weeks after pasteurising or sterilising, it is necessary to prepare a very stable gelatinised starch paste indeed.

Elsewhere[1] we have described in detail the influence on the consistency of starch milk puddings, of variations in cooking temperature, cooking time, starch concentration, some starch types, of cooling methods, keeping temperature and keeping times.

A cold mixture of the starch (and sugar) with part of the milk is made and added to the greater part of the milk heated to about 95°C. The starch gelatinises instantly. After temperature recovery, the cooking is continued at about 93-97° for 15-30 minutes, whilst stirring moderately vigorously. Then, to obtain a more creamy (somewhat thinner) product, rapid cooling with continued stirring to 50-70°C. is advantageous. Another possible way of preparing the puddings is to add the premix of starch and some milk to the rest of the milk at room temperature or slightly higher, and then heating. The gelatinising region of temperature is then passed much more slowly. Somewhat more starch should be used, the consistency of the cooled end-product may be less gelatinous, but more wheying-off can occur.

Chocolate-starch-milk pudding

This type of product is a starch-milk pudding flavoured with cocoa. Typical compositions are 3·6-4·0% starch, 8-9% sugar and 2-3% cocoa-powder.

The preparation is much the same as for the custard puddings. The new element is here the cocoa-powder. Mostly a flatter type with 22-24% fat is used, but it is also possible to use a cocoa-powder with 10-12% fat. The fat-free dry substance is the most important bearer of colour and taste. On cooking a cocoa-starch-milk pudding for a short time, *e.g.* for 1 minute, the product as obtained after cooling has a definite purple-brown colour. This can be made more brown or yellowish-brown by adding yellow colouring substances. If this is not allowed, it is possible to remove the purple hue by cooking longer, for 15-20 minutes with fatter cocoa-powder, 30-40 minutes with the less fat type. This longer cooking improves the consistency too, but the colour can fade somewhat.

In conclusion, some other types of cereal-milk puddings of minor importance are: rice-milk pudding, using 5-7% rice kernels and sweet milk; wheatflour pudding, with buttermilk or with sweet milk; and semolina pudding.

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1. R. Rutgers. *J. Sci. Food and Agric.*, 1956, **9**, 61 and 69.

Chemical Analysis by Colorimetry

THE fifth edition of The Tintometer Limited's handbook of chemical methods* has been entirely rewritten and enlarged to 360 pages. To allow for additions, it has a hard-wearing stiff cover and a loose leaf ring binder. Each book is sold with an offer of free copies of new additional pages as they are issued, for a period of two years. Three different indexes are provided for easy reference, and the pages are colour-coded with a coloured corner in seven parts, each part having a colour. Tests which are appropriate to more than one part are repeated in each. Each test is discussed in its turn in relation to the various applications which may be required, with general background notes in many cases concerning reliability, special precautions, and suggested uses. Then follows, in clear form, details of reagents required and the step by step technique for performing the test, and a list of biographical references for further reading if required. Over 150 different tests are dealt with, and the publishers say that fresh tests will be added to the book as they become available. The standard of presentation of the text is high, being clearly printed on good quality paper, and the back cover is provided with a useful pocket folder.

* *Colorimetric Chemical Analytical Methods*. The Tintometer Limited, Salisbury, 1959. Pp. 360. 30s. net.

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Fruit, 1958

WHILE the 1957 world exports of canned and dried fruits and fruit juices all showed some decline from the previous year's comparatively high levels, world exports of fresh fruit during the year rose by 11% and created a new record. The Commonwealth Economic Committee's annual review* shows that the total supplies of fresh, canned and dried fruits and fruit juices entering into international trade were equivalent to nearly 11½ m. tons of fresh fruit, or over 8% more than in 1956 and nearly 40% more than in the years immediately preceding the war. Commonwealth exports of fresh fruit continued to rise, and the Commonwealth share of world trade, in terms of fresh fruit, was almost 1½ m. tons, or about 13% of the total, the same proportion as in 1956.

* *Fruit, A Review*. Published for the Commonwealth Economic Committee by H.M.S.O. 1958. Pp. 188. 5s. net.

FOOD MANUFACTURE
ANNUAL REVIEW

Dairy Products

By E. J. Mann,* N.D.D., C.D.D.

Milk deodorisation ★ Flavoured milk drinks ★ Sweetened modified cream ★ Buttermaking ★ Cheesemaking ★ New cheese products ★ Concentrated milk ★ Dried milk ★ Whey utilisation

Milk deodorisation

EQUIPMENT for deodorising cream for buttermaking has now been on the market for many years and has, in many countries, become part of the standard equipment for butter manufacture. More recently, this treatment has been extended to ordinary market milk which is not infrequently contaminated with off-flavours from weeds. In the U.S.A.,[1] a deodorising plant has been designed for use with H.T.S.T. or Ultra High Temperature plants, which is claimed to remove odours without the use of vacuum pumps, steam injectors, or similar devices, thus eliminating product loss. Milk may be deodorised either raw or pasteurised, but the best results are obtained at temperatures of 162°F. or higher. As the milk enters the chamber it is forced through a special sanitary nozzle, and strikes a diffuse disc which causes the milk to form a very fine umbrella-shaped film. This film spreads out to a circle about 20 in. in diameter, cascades down to the top of the cone bottom and is picked up and sprayed through the nozzle again. During this process, which is repeated three times, non-condensable gases are released and rise to the cold zone created in the side chamber by means of a cold water spray. The unit has been used with a Roswell U.H.T. pasteurising plant for the treatment of market milk.

A British firm, in conjunction with its American associates, has also developed equipment for deodorising market milk.[2] In the process, milk after being heated at 162°F. in the pasteurising plant, passes into a distillation vessel, its temperature being raised on the way by steam injection to between 175° and 195°F. according to the intensity of treatment required. The vessel is maintained at a vacuum of approximately 20 in. Hg, and on entering it the milk flashes or boils and is atomised into a fine spray. A large milk surface is exposed during this treatment, and any off-flavours are released and carried away with the flash steam to the ejector condenser. Where particularly pronounced off-flavours occur, wash steam may be injected at the bottom passing in countercurrent upward through the down-flowing milk spray. The milk is withdrawn from the bottom of the vessel by a centrifugal pump and is returned to the heat exchanger where it is cooled in the usual way by thermal regeneration against the incoming cold milk.

Although milk composition can be controlled fairly accurately in this system by maintaining a constant temperature difference between the milk leaving the holder and that leaving the vessel, it must be pointed out that present regulations in Great Britain would not permit this process for the treatment of market milk as it virtually involves "adulteration" of the milk by steam injection.

Flavoured milk drinks

In recent years, coinciding with an increasing milk surplus, flavoured milk drinks have gained in popularity in this country and are beginning to form an important outlet for surplus liquid milk. Most of the literature in this field has been concerned with attempts to increase the stability of these products which generally tend to form precipitates on standing.

Some time ago, it was reported that Dutch scientists had developed a fruit-flavoured milk drink which will not curdle on pasteurisation or sterilisation.[3] The process consisted of adding a special pectin preparation to the raw milk, followed by fruit juice and sugar 2-10 min. later. After a further 10 min. the milk could be pasteurised or sterilised in the normal way.

Work on similar lines has been reported from Yugoslavia, where workers have studied the effect of pectin on the stability of milk in the manufacture of fruit-flavoured milk drinks.[4] It was apparent from the results that when high-quality pectin was added at a rate of less than 0·1% before adding fruit juice to the milk, no precipitation occurred. When higher pectin levels were added, however, curdling did occur to an extent directly proportional to the

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amount of pectin added. It is suggested that before pectin is added, the *p*H of the milk should be adjusted to 6·6-7·0.

A recent American patent[5] is concerned with similar aspects. It is claimed that a non-curdling milk drink can be obtained by mixing milk with a natural liquid orange concentrate made up of fresh orange juice and relatively large amounts of orange peel oil and pectin, together with sugar in solution. By mixing four parts of milk with one part of orange concentrate, a satisfactory orange-milk drink can apparently be made.

It would appear from the work reported above that the use of pectin in the right concentrations could pave the way towards the manufacture of a truly stable milk drink flavoured entirely with natural fruit juices.

In another American patent,[6] it is claimed that when Irish Moss extract stabiliser is added to milk on its own, the mixture pasteurised and cooled and flavouring substances such as cocoa, chocolate syrup, etc., added to the cooled mixture, the flavouring ingredients will remain suspended and stabilised in the drink even though they are present in the form of small particles.

Sedimentation is a particularly serious problem in chocolate milk drinks, and a number of American patent claims, aimed at overcoming this problem, have recently been made. In one of these,[7] a process for making an imitation chocolate flavour with a "buttery" aroma, by reacting partly hydrolysed milk protein with lactose (the reaction mixture also containing hydrolysed milk fat), is described. The flavouring substance is claimed to be suitable for making flavoured milk drinks.

The same patentee[8] has also described a process for extracting water-soluble chocolate flavour from unroasted cacao beans with an aqueous solvent. The concentrate obtained is claimed to provide chocolate-flavoured milk drinks without sedimentation.

The whole problem of sedimentation in chocolate-flavoured milk drinks has been discussed and reviewed at length in the light of recent investigations by a Dutch worker.[9]

A novel way of flavouring milk, which has already found wide market application, is by inserting a flavouring concentrate into drinking straws. Such straws are covered in a recent American patent[10] with particular reference to chocolate and strawberry flavouring substances suitable for milk drinks.

Sweetened modified cream

Workers of the U.S. Department of Agriculture have reported the development of a new sweetened cream product which will keep well without refrigeration.[11] The four steps involved in the preparation of this product are: (*a*) separation of cream with high fat content; (*b*) addition to the cream of an optimum amount of dried skim-milk; (*c*) addition of sugar to preserve the product; and (*d*) pasteurisation.

Each step can be varied in one or more ways, but a typical modified cream will contain about 40% butterfat, 32% sugar, 8% dried skim-milk, and 20% water. A typical example of its manufacture consists of stirring 10 lb. of dried skim-milk and 52 lb. of cane sugar into 100 lb. of cream containing 65% butterfat. The mixture is heated to 200°F., cooled by regeneration, drawn into a vacuum chamber to remove air and packaged with a minimum of air incorporation.

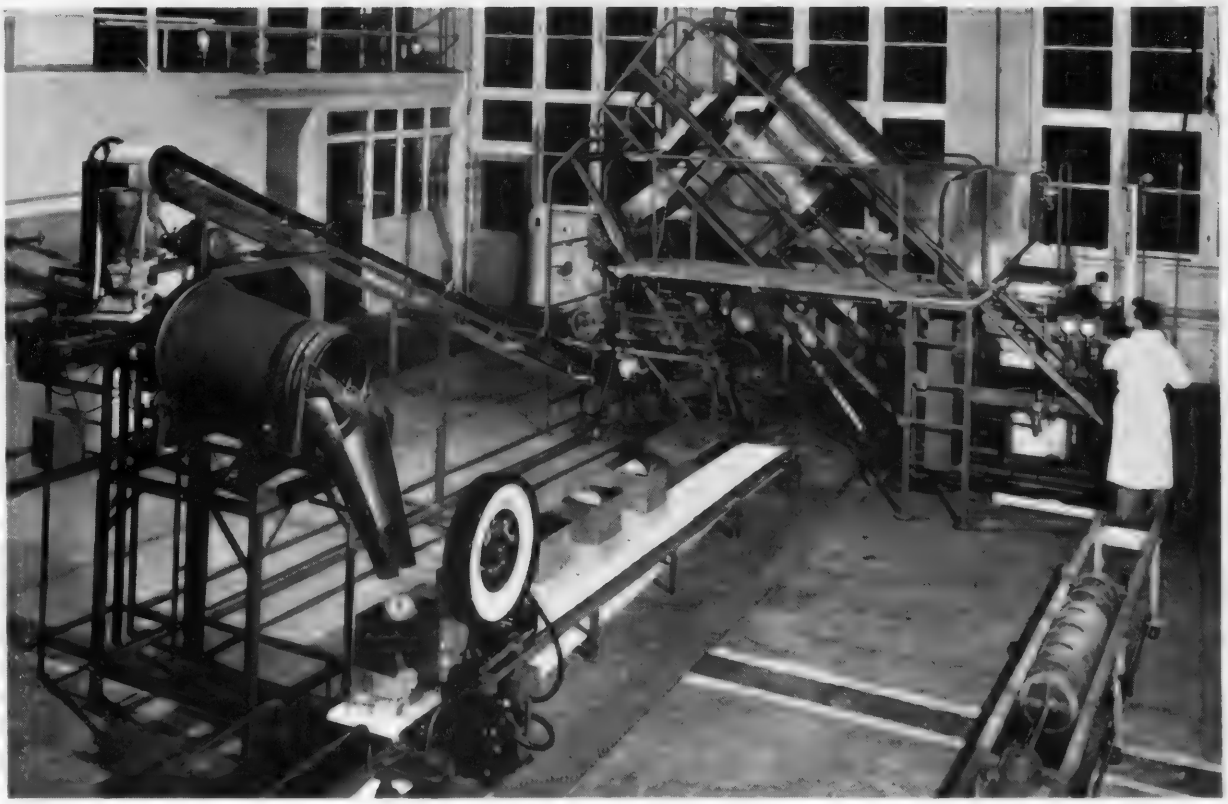
In appearance, flavour, and consistency, the product resembles sweetened condensed milk. It is, however, much less sweet because of its higher milk solids content and consequently lower water content. Less sugar is required to achieve the sugar-in-water concentration of 60-65% necessary for preservative action. As the butterfat content of the new modified cream is about five times as great as that of sweetened condensed milk, the product provides a means of preserving milk fat from a period of surplus. From the economic point of view, the fact that it can be stored at 50°-60°F. represents a great advantage. It is believed that sweetened modified cream will find application in ice cream manufacture, in the bakery industry as well as in coffee and flavoured drinks.

Buttermaking

Reports are continuing to come in on the use of frozen cream for buttermaking. Favourable results have been obtained in Germany,[12] where workers successfully stored pasteurised summer cream for 5-6 months, in suitable containers such as polythene bags, at −22°C. Subsequent blending of the cream with winter cream was achieved most satisfactorily by thawing the frozen cream rapidly by mixing it with fresh milk at 25°C. Butter made from winter cream containing at least 20-30% of frozen summer cream was superior to normal winter butter in colour and texture, and equal to it in keeping quality and flavour.

A detailed study on the use of frozen cream for buttermaking has also been reported from the Danish Dairy Research Institute.[13] In these experiments, the best results were obtained by packing high-quality, pasteurised, and cooled cream containing about 50% butterfat into polythylene bags, inserting these into cartons and keeping them in a cold store at a temperature of −18° to −20°C. until required for use. When it is required it is first kept for two days at 12°-15°C. after which it can be mixed with fresh cream either in a hopper placed in front of the cream pasteuriser or in the cream souring tank.

The same workers also obtained good results with high-quality unsalted sweet cream butter packed in aluminium foil-lined containers and placed in cold storage for subsequent use for winter butter production. Such butter could be blended either with fresh cream or with fresh butter, and the quality of the blend was not affected to any extent as long as the proportion of cold-stored butter did not exceed 30%. Although the flavour of butter made with the admixture of frozen cream or frozen butter was generally equal to that of normal winter butter during the



Mechanised cheddar cheesemaking has been introduced into Australia, and the process of milling, salting and hooping is carried out continuously and automatically with this equipment.

first few weeks after manufacture, its keeping quality tended to be less good.

Finally, a German worker[14] has reported the successful use of aluminium containers for freezing cream and parchment paper for wrapping the frozen blocks of cream before cold storage. The author has calculated that the total cost of freezing and thawing would amount to 38·42 D.M. per 100 kg. of butter.

About three years ago, a method of emptying butter from the churn by pump, reported from Denmark, aroused considerable interest. Trials with this method have also been reported from Sweden,[15] where experiments were carried out at five creameries during the winter months. Difficulties were encountered in emptying butter churns completely by pump on account of air pockets developing. The butter also exhibited a tendency to become soft and sticky after being pumped, and it was therefore important not to work the butter too much before pumping. However, the quality of pumped butter after 14-28 days' storage at 14°C. and three months' storage at −20°C. was similar to that of comparable butter removed manually from the churn.

The difficulty of obtaining a really fine moisture distribution in butter made by the ordinary churn process is well known, and a butter homogeniser, known as the *Mikrofix*, has been developed in Germany in order to overcome this problem.[16, 17] The machine is driven by a 20 h.p. motor and it has a variable capacity, from 500 to 1,400 kg. per hr. The butter is subjected to thorough mixing by means of worm screw action within the machine, resulting in a very fine moisture distribution and a product of improved keeping quality. It is also claimed to be of considerable value in the reworking of cold-stored butter.

Cheesemaking

In the field of cheesemaking, because of the high cost of labour in most countries, mechanisation of the cheesemaking process and the continuous manufacture of cheese have been the chief subjects for research. The Australian workers who set themselves the task of mechanising the Cheddar cheesemaking process a few years ago and who recently reported the development of a mechanical cheddaring machine, have now completed the mechanisation of the whole process.[18] Milling, salting, and hooping machinery has been developed to carry on the process when the curd leaves the curd-fusing machine. The equipment (illustrated) is so designed as to make the process entirely continuous and automatic, and it can be used both in the manufacture of conventional and of short-time Cheddar cheese. The slicing and milling unit has a capacity of up to 6,000 lb. of curd per hr., while the salting and hooping plant can deal with up to 3,500 lb. of curd per hr. It is claimed to do the work of four men.

In the United States, several groups of workers have been working on similar lines. McAdam *et*

al.[19] have reported a new mechanised cheesemaking process known as the *Ched-O-Matic*, which requires, in addition to the conventional cheese vats, one rotary drainage tumbler drum, two mechanical hydraulic whey extrusion presses, and accompanying shredder and salt spraying devices. The process described will yield a single curd block weighing approximately 1,200 lb. from one vat of 13,000 lb. of milk. A feature of this process is the virtual omission of the conventional cheddaring process, the curd being compressed into a large single block in a hydraulic press fitted with a system of top and bottom screens. When pressing is complete, horizontal knives automatically cut slices off the bottom of the curd block, the slices then being cut into small blocks by vertical knives. The blocks are then milled and salt solution sprayed on to the milled curd particles as they pass through a worm screw conveyor. The curd is fed into square hoops and the remaining process of pressing and ripening is carried out in the conventional manner. Accounting analyses of the operation have indicated that a cost reduction of about 1 cent per lb. of cheese produced by this process is attainable.

Another group of American workers[20] has developed a new method based on the conventional 7-hr. method, except during the period from draining the whey up to milling the curd. In the process, the curd-whey mixture is pumped with a positive-action rotary pump into a cheese cloth-lined perforated curd retention and matting device placed in a tank. The device can hold the curd from 4,000 lb. milk. The curd settles on the bottom and is pressed under the whey which is later run off. The curd is allowed to mat for two hr. without being turned, and is then milled, salted, pressed, and hooped in the usual way.

On more ambitious lines is an American patent[21] describing a process for the continuous production of edible casein which may well prove to be a forerunner of a continuous cheesemaking process based on entirely new principles. In the process, dilute acid is added continuously to a stream of skim-milk at a predetermined rate to initiate precipitation of the casein; the acidified material flows continuously through tubing while coalescence of the curd takes place. The rope-like casein mass finally produced is discharged on to an endless belt or a screen drum to allow the whey to drain off.

Interesting developments in continuous cheese manufacture have also been reported from Russia,[22] where use has been made of three mechanical cylindrical cheese vats and of mobile curd tanks to ensure continuity of the process. The milk, after clarification, fat standardisation, and pasteurisation, passes into each of the vats successively for coagulation, cutting, mechanical stirring, and scalding.

New cheese products and varieties

With cheese meeting increasing competition from other food products on the market, technologists are constantly striving to develop new products and varieties.

Russian workers have studied the possibilities of making soft cheese from evaporated milk concentrated to a total solids content of 30-40%.[23] The best results were obtained when milk containing 37% solids was coagulated using calcium chloride, trisodium phosphate (hydrated), Dutch cheese starter, and rennet, the cheese being inoculated subsequently with a suspension from Latvian cheese. Cheese produced thus was of satisfactory quality after 2½ months, and it is pointed out that the process might be of use in the continuous production of soft cheese.

Another Russian worker[24] has reported studies on the manufacture of sterilised tinned cheese. The best overall results were obtained when the *p*H of the molten cheese was adjusted to 5·30-5·60 by adding citric or trioxyglutaric acid, and the cheese mass was sterilised at 100°-105°C. without holding. A cheese of good keeping quality with no tendency to butyric acid fermentation was obtained.

A process for the manufacture of a mild cheese cream, based on Emmental cheese and natural fruit juices, has been patented in Germany.[25] It involves mixing Emmental cheese, butter, phosphates, and water, heat-treating the mixture at 85°-95°C., stirring in sweet grape juice or apple juice and packaging the product in the usual manner.

In Czechoslovakia, the manufacture of dried cheese has been investigated, using a laboratory drier.[26] It was shown that in order to achieve optimum drying it was necessary to grate the cheese into long thin strands. Homogenisation of the cheese-milk did not have any effect on the drying rate or on the intensity of fat seepage during drying. Spray-dried cheese powder generally contained less than 3% moisture, and the processing and drying tended to improve the flavour somewhat but to decrease the soluble nitrogen content.

Concentrated milks

In the U.S.A. work has been in progress for several years to develop a satisfactory sterilised concentrated milk which, when reconstituted with water, would possess characteristics similar to ordinary market milk. Such a product, a 3 : 1 milk concentrate, has in fact been tried out on several markets in the U.S.A. but has in the past met with only limited success.

The problems of gelation and protein flocculation, which have been encountered in previous products of this type, appear to have been overcome in a process developed by workers at the University of Wisconsin, which is claimed to result in a product with a shelf life of 5-6 months at 70°F. without excessive flavour and body changes.[27] In the process, the sterilised milk concentrate is held at high temperatures long enough to produce gelation, the gel being broken up mechanically before it goes far enough to result in a grainy product. It is claimed that this modification prevents subsequent gel formation in the canned concentrate. However, the process involves no less than three heat treatments, and one cannot help feeling that the necessary physical requirements

have been attained at the expense of the nutritive value of the milk.

That interest in the development of a sterile milk concentrate is fairly widespread is borne out by the fact that several patents have been taken out for such products. In one of these,[28] milk is preheated at 269°F. for 35 sec., concentrated to 26% solids, the concentrate sterilised and stabilised against storage gelation at 264°F. for 70 sec. before being cooled to 210°F., homogenised, and canned aseptically. Here, too, it is claimed that the time-temperature treatment chosen for the sterilisation stage is the most suitable for preventing gelation and for preserving the original characteristics of the milk.

Another American patent[29] differs fundamentally in that the milk is sterilised before concentration. In the process, raw milk is flash-heated to 120°-180°F. to melt the butterfat, homogenised, and sterilised in the range from 250°F. for 5 min. to 300°F. momentarily. The milk is then evaporated at a temperature below 140°F. in a falling film evaporator, cooled, and canned aseptically, no further heat treatment apparently being required. Whole milk may be concentrated to one-quarter or one-third of its original value by this process, which is claimed to result in a product of good stability and free from cooked flavour and discoloration.

Dried milk

In last year's review, the section on dried milk was devoted entirely to the important development of "instant" milk, providing a modified skim-milk powder instantly and completely soluble in cold water. Although the "instantising" process probably represented the most important development in dried milk manufacture for many years, the process was not suitable for dried whole milk manufacture, and it was to be expected that research workers would devote their attention to developing a process for the manufacture of "instant" dried whole milk.

Workers at the East Regional Research Laboratories in Philadelphia have, in fact, reported the development of an entirely new physical form of dried whole milk.[30] The technique used in the process is entirely new to the dairy industry. It is the puff-drying process already applied successfully in the drying of heat-sensitive citrus juices and other food products in both batch and continuous methods. Essentially, the process of puff-drying may be defined as the formation of a highly expanded, sponge-like structure of dried material from a thin film of concentrated liquid under conditions of high vacuum and low temperature. On account of its large surface area per unit weight and the high vacuum employed, the product would be expected to disperse readily and to possess a natural flavour. In experiments using a pilot plant vacuum shelf drier, optimum results were obtained when homogenised milk was pasteurised at 162°F. for 16 sec., concentrated to 47-50% total solids at a temperature of 85°-100°F. in a high-vacuum, falling-film evaporator, heated to 135°F., and nitrogen bubbled through the concentrate which is then homogenised twice, first at 4,000 lb./sq. in. and then at 500 lb./sq. in. before being spread thickly over stainless steel drying pans, chilled to a temperature of 55°F. or below, and dried as a foam in a vacuum shelf drier. The resulting mass is crushed lightly through stainless steel screens.

The foam-dried product was found to disperse much more readily in cold water than did commercially dried milks, *i.e.* the foam-dried milk dispersed completely in water at 38°F. within 100 sec. and in water at 75°F. within 50 sec., using manual stirring. The reconstituted product possessed an excellent flavour and no differences were noted between the ultra-centrifugal patterns of the whey proteins of fresh whole milk and those of foam-dried milk.

The same workers[31] have reported further studies on the effects of storage on the dispersibility of a foam-dried product made from flash-pasteurised whole milk. Their results indicated that foam-dried whole milk could be stored for at least one year at 73°F. without losing its excellent dispersing properties. Some loss in dispersibility did occur, however, when the powder was stored at 100°F. and water at 38°F. was used. Forewarming the milk at 190°F. for 2, 5, and 8½ min. had no adverse effects on dispersibility of the foam-dried milk made therefrom, but after one months' storage at 100°F. the dispersibility declined, the decline being related directly to the length of the heat treatment. The foam drying process has also been applied successfully to the manufacture of lactose-enriched whole milk, an acidified whole milk and a chocolate-flavoured whole milk.

Other workers,[32] investigating the free fat in foam-dried whole milk, found that when the whole milk concentrate was heated immediately before drying, large increases in free fat could be prevented. Free fat was also found to decrease slightly with increases in homogenisation pressure.

On more conventional lines, investigations at Wisconsin[33] were designed to study the factors influencing the "sinkability" of dried whole milk (*i.e.* the time taken for powder to sink when placed on a quiescent water surface). It is known that dried whole milk generally exhibits the greatest sinkability when first removed from the drier, but tends to lose this property on storage. The trials showed that by subjecting powder to a special post-drying temperature treatment, the initial sinkability could be considerably improved. Storage tests indicated that this property was not lost even after months of storage.

Although very low temperature drying processes for milk have been reported in the literature from time to time, they have not found commercial application to any extent. Judging from two recent reports in the literature, interest in such processes appears to be increasing once again. In the U.S.A.,[34] pasteurised milk, pre-concentrated at a low temperature, was dried in a vacuum plant in which evaporation could be carried out at vapour temperatures of just above 0°C. The drier was equipped with electric

heating elements which allowed heat to be applied over a wide temperature range. Heating was intense at first while the product had a high moisture content, but was reduced progressively as the product became drier in order to avoid protein damage. It was claimed that the product, when reconstituted, compared favourably in flavour with fresh pasteurised whole milk. The air-packed powder had a storage life of less than thirty days at room temperature, but this could be prolonged to 60-80 days by storage at 2°C.

Finally, reference to a new low-temperature drying process for milk has been made in a German article.[35] Although few technical details are given about the process, which is being patented in many countries, it apparently involves drying at temperatures between 0° and 30°C. under reduced pressure.

Whey utilisation

With cheese production continuing at high levels in many countries, the problem of how to utilise the whey continues to be of considerable importance.

The uses of whey solids in different food products have been discussed in an interesting article.[36] Whey proteins are stated to possess advantages over other milk products in certain types of soups to which they impart emulsion stability and improvement in body. Whey solids are also finding increasing application in the baking industry in a variety of products ranging from bread to biscuits and icings. As they are not readily affected by the low *p*H of fermenting doughs, whey solids add greatly to the extensibility of these doughs during the initial processing, and on account of their heat coagulability, they also contribute to the structure during baking.

In cheese foods and cheese spreads, whey solids are used effectively to carry flavour and to improve the consistency of the product. Whey solids are also finding increasing application in the confectionery industry where they accentuate added flavours and contribute a creamy and rich flavour in themselves to such products as fudge, caramels, and coatings.

The Meat Inspection Service of the U.S. Department of Agriculture has recently approved the inclusion of whey solids in comminuted meat products and meat loaves of various kinds, the whey solids imparting a better colour, better moisture retention, reduced shrinkage, and improved palatability.

In the U.S.A., the ice cream industry has undoubtedly provided one of the most important outlets for spray-dried sweet whey in recent years.[37] Usage has increased from a few thousand lb. in 1950 to over 20 million lb. in 1956. Whey solids are commonly used at a level of 20% of the serum solids in ice cream and in ice milk, while in soft serve mix, 30-40% of the serum solids may be whey solids. The principal advantages of whey solids in ice cream manufacture include relative cheapness, convenience of storage and handling, and uniform high quality. Blends of whey and milk solids as the complete source of serum solids are available commercially.

One of the factors limiting the value of whey for use as feeds or fertilisers is its low nitrogen and high lactose and salt content. Workers at Pennsylvania State University[38] have developed a process for manufacturing a high-nitrogen, low-lactose product from whey. The process involves the fermentation of cheese whey with *Lactobacillus bulgaricus*, as well as ammoniation of the whey by the addition of anhydrous ammonia, in order to neutralise the lactic acid formed during the fermentation. Both intermittent and continuous systems of ammoniation were used. The final product was concentrated and showed relatively low nitrogen losses during concentration and good nitrogen stability at room temperature for up to 1 year. Its value as a feed for calves and mature cows is to be tested.

A recent American patent[39] is on a somewhat similar basis. The process involves the anærobic propagation of yeasts and moulds in whey or skimmilk to which essential nutrients have been added, at a temperature of 80°-100°F. and a *p*H of 3·5 to 7·5. The protein content of the product is increased and the lactose content decreased as the result of multiplication of the cultures. When fermentation is completed, the microbial cells are broken down by various means and the product is spray-dried. Finally, developments in whey utilisation have been reviewed recently in a comprehensive manner.[40]

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The new creamery nestles in the midst of the rolling Devon hills.

Creamed Rice Production in Devon

Ambrosia opens new factory at Lifton

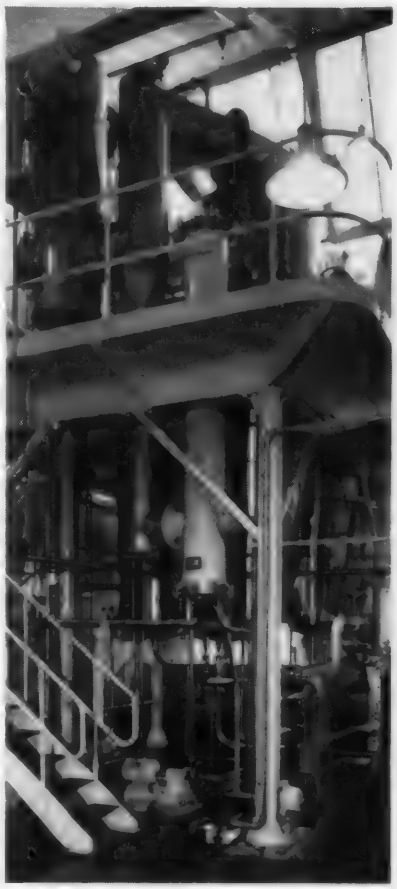
AMBROSIA, LTD., manufacturers of dried milk and other dairy products, have opened their most modern factory at Lifton, Devon, at a cost of £500,000. Mr. L. F. Matthews, chairman of Ambrosia, Ltd., who presided at the opening, recalled that the firm was founded 42 years ago by a Mr. Alfred Morris, who was joined at the end of the first world war by his son. The son was in charge of the Lifton and Lapford factories until his death last year. For a long time the firm has been one of the Bovril group of companies.

Just before the last war the firm decided to market the now well-known Ambrosia creamed rice, which found a ready sale. "Unfortunately," said the chairman, "the war came along and we were not allowed to go ahead with it, except for supplies to the Red Cross, prisoner-of-war parcels, and so on." Since resuming production, sales increased rapidly until the demand could not be supplied. Two years ago the firm therefore decided to build a new factory on seven acres of land.

The new factory was opened by Lord Roborough, Lord Lieutenant of Devon, who said that they were most interested in Devon to attract light industry to the county.

The milk evaporation plant installed in the new factory was designed and supplied by the Blaw Knox Engineering Co., Ltd., who supervised its erection. The installation includes the milk preheating and evaporating sections, supporting structure, and all auxiliaries and instruments. The preheating section makes full use of recovered waste heat, and the supply of steam and condenser cooling water is automatically controlled. The evaporator is a *Buflovak* vertical rapid circulation recompression double effect unit, and one of the design problems was to cope with a seasonal demand fluctuating between 50% and 120% of rated capacity. The plant has a nominal capacity of 20,000 lb. of whole milk per hour.

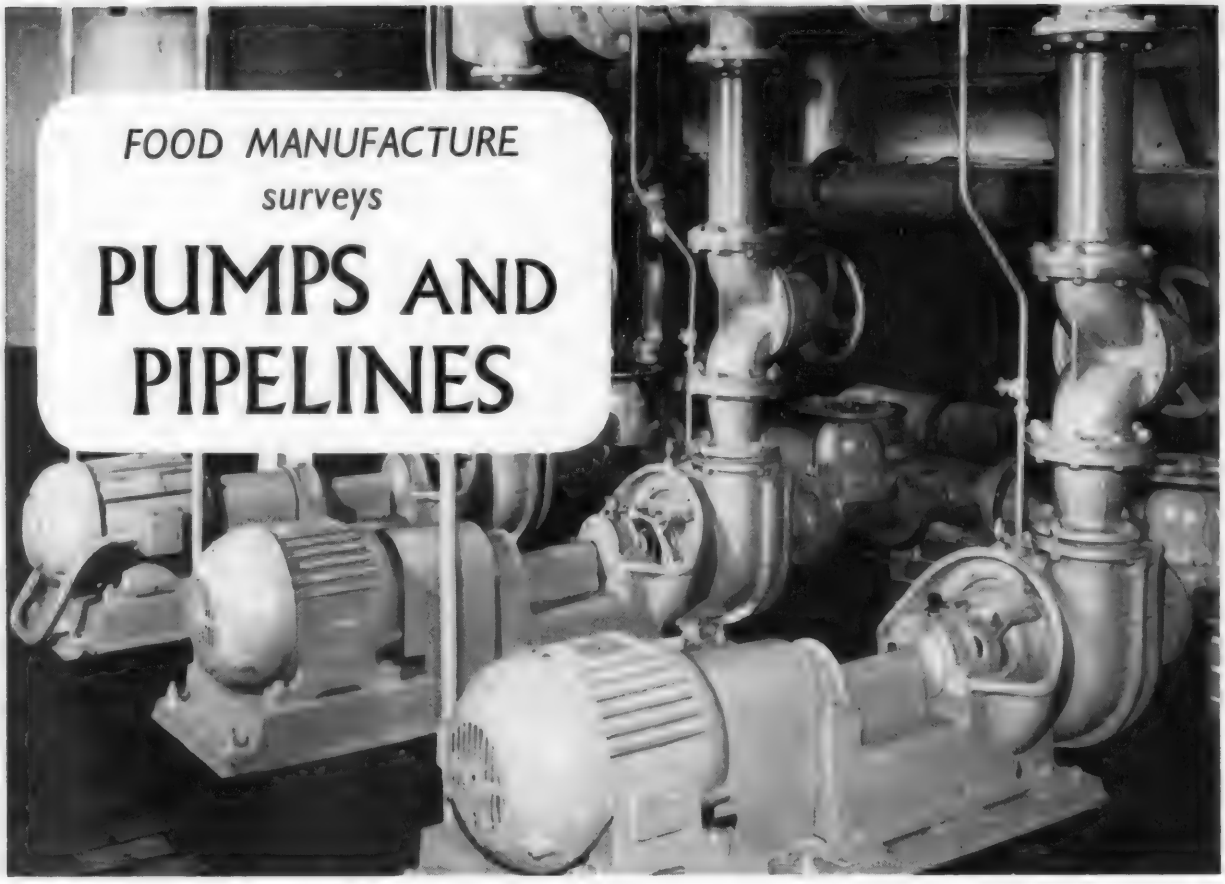
The supporting structure can be taken completely to pieces if resiting of the plant is needed. Maximum use has been made of prefabricated assemblies. All the instruments and controls are grouped on one panel, and a high degree of automation has been provided for. To achieve the greatest steam economy, the vapour is recirculated through a purifier and the condensate can be used again. It is claimed that entrainment losses are exceptionally low.



The Blaw Knox double effect recompression milk evaporator which produces a 2·5/1 whole milk concentrate at the rate of 2,400 gal. per hr.

FOOD MANUFACTURE
surveys

PUMPS AND PIPELINES



Pumps and pipelines are among the most basic items in a processing plant; this article describes a wide variety and gives some methods of protection.

PUMPS

Corrosion-resisting pumps

L. A. MITCHELL, LTD., manufacture a comprehensive range of corrosion-resisting pumps constructed with all contact parts in high grade corundum stoneware giving freedom from metal contamination and complete resistence to corrosion, which makes them particularly suited for a wide variety of acids. For small installations, a compact design of rotary displacement self-priming pump is available, as illustrated. This pump has a capacity of 780 gal. per hr. and, being completely self-priming, can be used to circulate corrosive liquors from submerged tanks and for emptying sumps, tanks and carboys, etc. including the pumping of acetic acid. A diaphragm type of pump is also available either as a hand operated unit or motorised for more continuous duties. Both these pumps are self-priming and the hand operated unit is particularly useful for emptying carboys and sumps of acid solutions at varying concentrations.

For the descaling of industrial boiler plants and evaporators and for descaling condenser tubes, etc., L. A. Mitchell, Ltd., manufacture a large range of single stage centrifugal pumps. Although normally supplied for permanent installation, they can be supplied as portable units fitted with an acid solution storage tank for the circulation of large volumes of acid solutions. The centrifugal pumps are not of the self-priming type but are usually supplied to work on systems having a slight positive suction head on the pump although they can be operated on a suction lift if suitable priming arrangements are incorporated in the layout of the suction piping. The corundum stoneware contact parts of the pump are efficiently armoured in cast iron casing to avoid mechanical damage. The pump shaft is supported in widely spaced rigid bearings to avoid excessive heating in the gland, which is designed to be virtually leakproof in operation.

The illustration at the top of the page shows a battery of three Mitchell 8/210 pumps, each of which has a capacity of 780 gal. per hr., is self-priming and is of the rotary displacement type.

The Pulsometer Engineering Co., Ltd., say they manufacture a very comprehensive range of pumping plant of all types to suit particular conditions, and are able from their standard range to supply most of the pumps required for the needs of food industries and processes. When a specified duty is stated, a pump to suit that duty can generally be advised and quoted.

Pulsometer milk and wine pumps are sanitary and may be easily dismantled and are used in dairies and breweries or for pumping other food products. The Pulsometer-Doulton stoneware acid pump has all interior parts lined with Doulton high quality acid-proof stoneware, no other material coming in contact with the liquid being pumped. The pump is practically non-porous, can handle most hot or cold corrosive liquids without contaminating or discolouring the material being pumped. The impeller is made of a special grade of corundum non-porous ware, with smooth finish and high tensile strength.

The makers say that a very large number of Pulsometer centrifugal pumps are supplied to margarine and sweet factories.

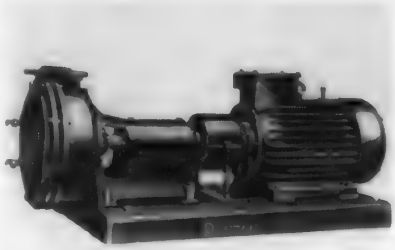
Easy-clean pumps

Alfa-Laval Co., Ltd., offer a wide range of easy-clean stainless steel pumps which they say are ideally suited for the food and beverage industries. They all embody the feature that they are easily dismantled with 100% acessibility for cleaning. The smallest of these pumps is the HM centrifugal pump with capacities of 220 g.p.h. at 16½ ft. delivery head, or 660 g.p.h. at 13 ft. head. The larger centrifugal pump type ME 155 is available with connections of 2 in. and 3 in. The 3 in. pump will deliver up to 13,000 g.p.h. against 52 ft. head, or 4,000 g.p.h. at 100 ft. head. The 2 in. pump, on the other hand, will deliver 4,400 g.p.h. against 65 ft. head. A high pressure model type MZ 155 is also available for delivery heads up to 180 ft. In all these pumps a special feature is that the impeller is made in two halves which readily takes apart for cleaning. The pumps can also be supplied with a specially graduated control valve on the outlet. When a suction lift is required the De Laval MR 166 radial vane pump can offer a lift of up to 25 ft., and it will deliver 1,100 g.p.h. up to 69 ft. head, or 3,300 g.p.h. at 33 ft. This pump is also readily dismantled.

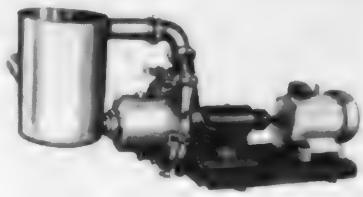
Quite a different type of pump is the DZ3R defoaming pump for handling aerated liquids. This pump performs the dual duty of initially separating air and then pumping the de-aerated liquid. It is suitable for such materials as starch liquors, gluten liquor, beer fob, molasses, fruit juices, etc.

Monopumps, Ltd., say that the principle of pumping used in the Mono Pump enables it to handle viscous liquids or solids in suspension. The rotor and stator engage with one another in such a way that cells or chambers of uniform shape and size are continuously created. This principle enables the pump to handle solids such as diced vegetables or peas suspended in liquid with an unusually high percentage of undamaged vegetables passing through the pump. The Mono Pump is self-priming—the liquid in which the solids are suspended being used as the requisite lubricant. The low non-pulsating fluid velocity through the pump is very useful when handling thick soups, and suitable speeds can be chosen to conform with the viscosity rating of the fluid. The Mono Pump is claimed to be smooth and silent in operation and so simply constructed that maintenance can be carried out by unskilled labour.

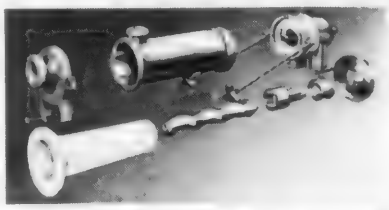
A new stainless steel Mono *Kwikleen* pump has now been produced for handling food products which conforms with all the hygienic standards of the industry. The complete pump, including the gland, can be dismantled by unskilled labour in a minute or two. The single mechanical seal can be sterilised with all the remaining component parts of the pump. All metallic surfaces are of smooth polished stainless steel. It is self-priming with a suction lift of 25 ft. and can be used for vacuum extraction duties. In addition, the constant rate of discharge is a distinct asset for high temperature short time processing. The pump is at present available for capacities up to 3,000 gal. per hr. with a maximum pressure of 30 p.s.i. and new pumps of the same design are shortly to be added to the range.



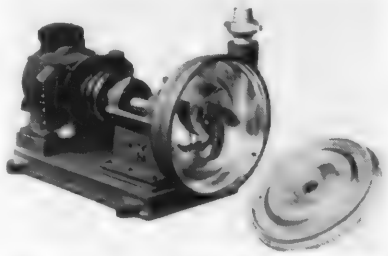
The Pulsometer-Doulton stoneware pump for handling most hot or corrosive solutions without injury to the pump or contamination of the liquid.



The De Laval defoaming pump type DZ3R for aerated liquids first separates air and then pumps, with defoamer and pump in one unit.



An "exploded" view of the Monopump K63 "Kwikleen" showing the main components.



Mackley sanitary pumps are designed to obviate holes and corners and are for use where cleanliness is absolutely essential.

For liquids of comparatively low viscosity, Mackley "CW" pumps cover a wide range of duties and are available in stainless steel, monel metal, bronze or iron construction. They are manufactured in six sizes, up to 5 in. bore discharge, handling quantities up to 700 g.p.m. against heads up to 100 ft. The stuffing boxes may be arranged for conventional packing or mechanical seals and the makers say that temperatures of up to 212°F. can be safely handled.

Where cleanliness is absolutely essential, *e.g.* in the handling of milk, Mackley sanitary pumps are specially designed to obviate holes and corners where contamination may take place. Screwed end covers and open bladed impellers make for easy dismantling and cleaning at regular intervals.

For the sugar industry, Mackley and Co. manufacture pumps ranging from horizontally split casing pumps, to handle sugar juice in quantities up to 3,000 g.p.m., to unchokeable pumps for handling solids in suspension up to whole beet. These latter pumps, type "UC," are claimed to be extremely versatile in the handling of syrups, pulps, fish, sliced beet, etc. The impellers are of the two-port open type contained in a special non-jamming casing. These pumps can be manufactured in special alloys, if required, with stuffing box arrangements to suit the medium being handled.

As a result of the success of their *Easiclean* pump (described in FOOD MANUFACTURE, April, 1957), Plenty and Son, Ltd., have now introduced four other pumps into the food industry range and now offer completely sanitary pumps in two other sizes. All the Plenty food pumps are designed for handling any viscosity, but particularly the heavier materials such as meat paste, molasses and biscuit mixtures, at pressures up to 200 p.s.i. They also supply pumps for extracting liquors from vacuum vessels and, due to the wide sealing surfaces in the pumps, are claimed to give long life on this duty. The ML *Easiclean* has a nominal capacity of 0·2 gal. per 100 revs. and is made in the infinitely variable construction. The next pump in the range is the AB *General* fixed capacity type. Also in this size there is the AB *Universal* which has a nominal capacity of approximately 5 gal. per 100 revs. and is infinitely variable for all outputs between zero and the maximum. The largest size of Easiclean pump is the BC *General* fixed capacity unit, which has a nominal capacity of 19 gal. per 100 revs. All these pumps can be supplied in stainless steel and *Railko*, a special type of bonded asbestos, which

The Plenty AB Universal variable capacity pump has a nominal capacity of approx. 5 gal. per 100 revs. and is infinitely variable for all outputs between zero and the maximum.

is normally suitable for the lower pressure applications. For the higher pressures, pumps are constructed in stainless and *Pasim* alloy, which is a special bearing metal which has been developed by this company for food applications. In addition to its use in pumps, it is also available to food manufacturers for footstep bearings in mixing bowls, etc. It is based on nickel, but it contains a proportion of copper and lead. Though it is not truly stainless for all applications, it can be used for a number of applications.

Rotary pump

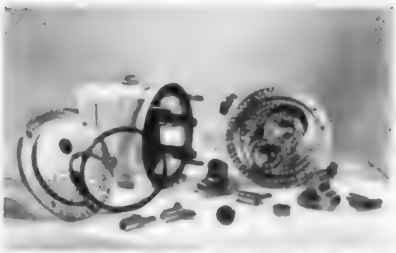
A new pump, called the *Rotary Easy Clean* pump, has been introduced by Stainless Steel Pumps, Ltd. The makers claim that the pump is particularly suited for handling sticky and viscous liquids.

The pump has splined shafts where the rotors are fitted and a standard type "O" ring joint between the rotor case and the back plate. Reduced width rotors can be fitted for operation at pressures of 120/150 p.s.i. The pump is self-priming and can run completely dry for up to 30 min. without seizing up.

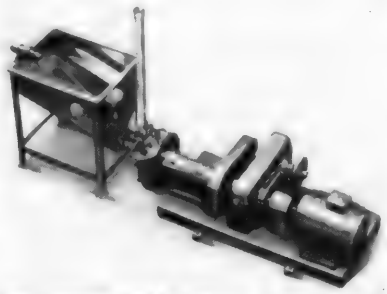
The pumps are made in a range of four sizes, for capacities from 50 to 6,000 g.p.h.

Pea pump

Mather and Platt, Ltd., manufacture a wide range of pumps of various types. One of these is the pea pumping unit illustrated, its function being to convey such products as peas from one part of a factory to another or from one machine to another. A variable



The Rotary Easy Clean pump made by Stainless Steel Pumps, Ltd., is designed to be particularly suitable for sticky and viscous liquids and is self-priming.



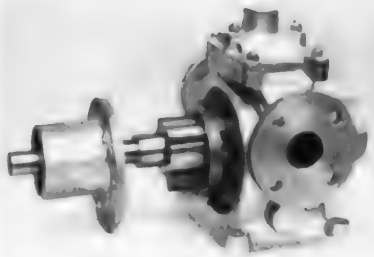
The Mather and Platt pea pumping unit conveys peas and similar products without damage and with a beneficial washing effect.

speed gear is provided to enable the ratio of product to water to be kept at an economical figure in spite of variations in the rate of throughput. The glass tube mounted on the pump outlet enables the operator to adjust the pump speed correctly.

An interesting point is that the product passes through the impeller of the centrifugal pump. In spite of this, no damage results and the makers say that the operation has a definite beneficial washing effect on the product. In a pump for this application, care is taken to ensure an adequate clearance for the product inside the pump to avoid damage. This pump design has been developed from that used for many years in the brewery trade and now a larger unit is being produced to take suspended solids up to 2 in. in diameter. The ease of maintenance of such a unit often makes it preferable to a bucket elevator for connecting two units in a vegetable preparation line. Its maximum recommended duty is 5 tons of product per hour against a head of 30 ft.

Mather and Platt say that *Solovane* centrifugal pumps are now being used to provide water at a pressure suitable for conveying filled and processed cans of vegetables through specially designed conveyor ducting.

Mather and Platt have also developed a pump for filling a wide range of fluid and homogenous products, and those consisting of stable suspensions, containing fruit stones or whole fruits. The pump consists of a pair of single

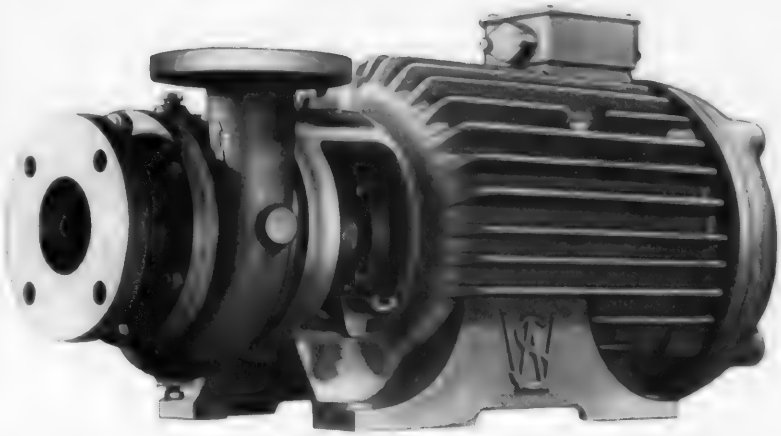


In this Orr Products G.P. pump the pumping compartment is completely isolated from the bearings by self-adjusting carbon face seals at either side which eliminate contamination.

tooth intermeshing impellors driven through a variable speed gear.

G.P. pumps made by Orr Products are claimed to be particularly suitable for pumping the fluids used in food manufacture, as the pumping department is completely isolated from the bearings by the self adjusting carbon face seals at either side that eliminate end thrust and are self adjusting for wear. The ball bearings are sealed and contain a life time supply of lubricant thus eliminating the possibility of fluid contamination and ensuring that the pump can be run for long periods without servicing. The internal working parts are easily replaceable and pumps are made in a wide variety of metals to suit the fluid.

Orthos (Engineering), Ltd. supply three types of pumps, each with its own particular field of application. Bran and Lübbe metering pumps are piston pumps, used for metering liquids and suspensions, in many cases as part of a larger blending-mixing, etc., unit. Up to 16 different liquid components, and with necessary attachments some solid component can be metered with one unit, and the quantity of each component may be varied infinitely over the range of the particular pump. Furthermore by incorporating variable gears, a ratio of components may be set, and the total output varied by the speed of the pumps. Karl Kranz pumps are for use where conventional valves do not function satisfactorily. An adapted type of gate valve, mechanically operated, opens and closes the pressure and suction port. Viscous material, thick pastes, semi-solids and where materials are in a vessel under pressure or vacuum are the fields where this type of pump is claimed to be of exceptional value. The Lederle rotary piston pumps type HKN have been designed specifically for the food industry. They are said to be capable of handling a large variety of liquids, either viscous or normal, and have been so shaped that they are easily dismantled, and all parts sterilised or cleaned. With a variable gear between the motor and pump, the pump can also be used as a metering unit.



The Worthington-Simpson type DMC "Monobloc" chemical pump with totally enclosed fan-cooled motor handles a wide variety of acids, alkalis and slurries.

Chemical pumps

Worthington-Simpson chemical pumps, of patented *Monobloc* construction, comprise an extensive range of acid and alkali resisting pumps designed specially for the chemical and allied industries.

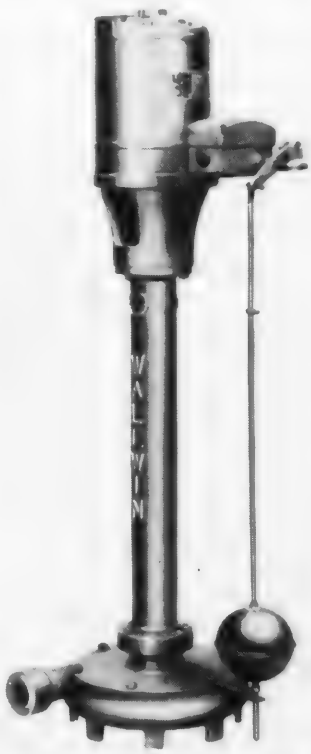
The *Monobloc* construction, in which the pumps and motors are combined to form single, compact, balanced units, has eliminated extraneous baseplates, couplings, belts and pulleys. It is claimed that the pumps fit easily into close quarters, are quickly installed and are free from vibration. The firm say that there is perfect and maintained alignment with the motor and no danger of distortion when bolting down or coupling to pipework.

The range of Worthington-Simpson chemical pumps covers capacities up to 675 g.p.m., with heads up to 125 ft. These pumps are constructed in either 18/8/3 stainless steel, *Worthite* or *Hastelloy "B"* depending upon the particular application. The makers draw attention to the availability of readily interchangeable mechanical seals to suit varying processes.

Sump pump

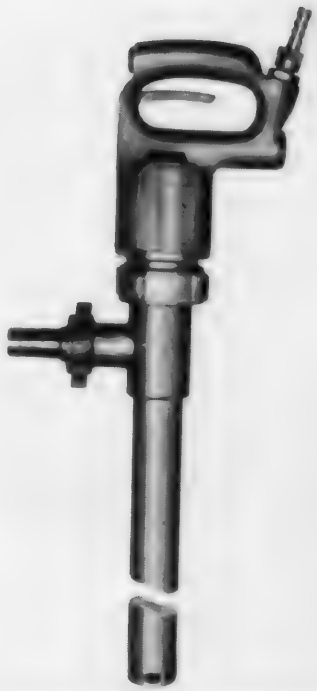
Wallwin (Pumps), Ltd., say that the latest addition to their range of non-chokeable pumps is a small unchokeable sump pump which will handle liquor containing solids up to $\frac{7}{8}$ in. diameter, and which is claimed to obviate choking troubles and to avoid the necessity for the constant cleaning of filters. This new pump is supplied as a fully automatic unit complete with motor, starter and float control gear and can be arranged for operation on either three or single phase supply.

It is claimed to be sturdy and simple in design, is fitted with self-lubricating bearings, mechanical seal and the Wallwin single bladed open type unchokeable impeller, and is easy to install.



The Wallwin unchokeable Sump Pump handles any liquor containing solids up to $\frac{7}{8}$ in. diameter and is fully automatic, with motor, starter and float control gear.

Flexible tubes of rubber, neoprene, plasticised P.V.C. and chlorosulphonated polyethylene are used by Merrill Pumps, Ltd. in their glandless, self priming diaphragm pumps; sleeve diaphragm stop valves; pressure relief valves; air cushioning vessels, and other items of fluid handling equipment. The essential parts of a Merrill pump are a flexible tube with a valve box housing a ball valve and a valve seat at each end of it. Pumping action is promoted by contracting and dilating the tube hydraulically. The pumps will handle capacities up to 50 g.p.m. and are claimed to work against discharge pressures up to 100 p.s.i.



The Briticent portable compressed air operated barrel pump weighs 11½ lb. and consumes 23 cu. ft./min. of air at 80 p.s.i.

Portable barrel pump

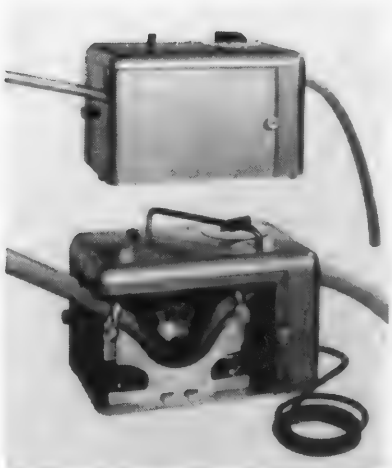
British Central Electrical Co., Ltd., have just added to their portable barrel pump range an air motor operated unit, which, it is claimed, can be used by unskilled labour.

The air motor operates from a 30 to 120 p.s.i. air line, without a reducing valve. The rotary drive is transmitted through an inner tube carrying the driving shaft which transmits the rotary motion to the impellor assembly. An outer suction tube fitted with hose attachment, for 1¼ in. bore hose, allows the liquid to be raised into a standard hose line. The off load speed of motor and impellor assembly is 16,000 r.p.m.; on load, 12,000 r.p.m. The consumption of the air motor with such liquids as water is approx. 20 cu. ft. per min. from an 80 p.s.i. air line.

The unit is self-priming, and, the makers say, will operate against full pressure. It will handle most liquids, and deliver up to 2,000 gallons per hour dependent on viscosity and lifting head, maximum head being approx. 25 ft.

Flow inducer

The flow inducer made by the Watson-Marlow Air Pump Co., Ltd., is not



The Watson-Marlow H.R. Flow Inducer induces flow of fluids, from slurries to gases, without the intervention of any extraneous device.

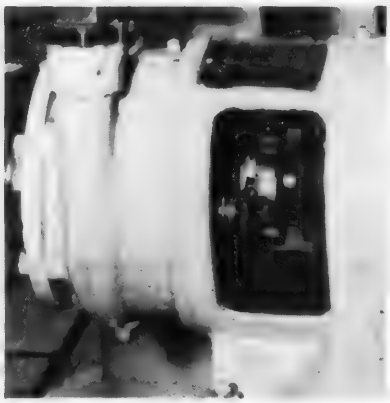
a pump in the ordinary sense of the word. It consists of a flexible pipe clipped to a curved track which is concentric with a rotor bearing three rollers. As the rollers go round they pass over the pipe and flatten it against the track at the point of contact, and as the "flat" moves along the track it drives before it anything in the pipe. At the same time the restitution of the pipe behind the roller creates a powerful suction, drawing in more fluid to be pushed by the following roller. The flow is reversible, and the rate is infinitely variable from a few ml. per min. to about 500 gal. per hr. The rotor speed is steplessly variable from 0 to 200 r.p.m. Pipes of any bore up to 1¼ in. O.D. can be used, and are supplied in a variety of natural and synthetic rubbers, P.V.C., and, for special purposes, with a Fluon lining.

Pump gears

Electropower Gears, Ltd., say that their gears are widely used in the food industry and are supplied to numerous manufacturers. The range of units they manufacture covers from 1/10 to approx. 300 h.p. and a wide range of speeds is available covering all sizes. They also offer geared units to give variable speeds using many methods including electronic control.

Pump glands and seals

The makers of the *Seatrist* T-Y gland, Ronald Trist and Co., Ltd., say that the expendable component of the running faces may be removed in a matter of minutes and a new part fitted without stripping the pump. They say that the gland is used not only in this country but also in the Middle East where maintenance is often carried out by native labour requiring simplicity of design and a long working life, and also that it has been specified for the new atomic power stations.

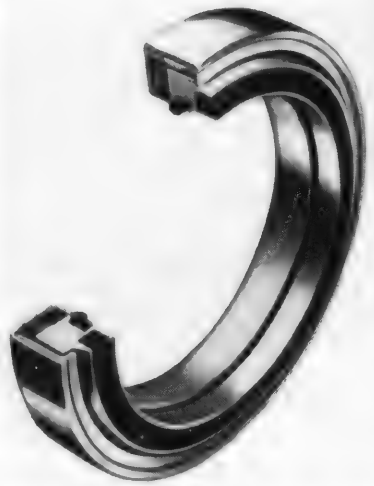


A Seatrist T-Y gland made by Ronalp Trist and Co., Ltd., fitted to a Worthington-Simpson pump retaining hot fats.

Charles Weston and Co., Ltd., say they make a comprehensive range of standard types of seal, and will produce to special order seals with stainless steel parts and tasteless rubber sealing lips, to suit the particular requirements of the food industry. They have recently introduced two new ranges of *Impax* seal, known as the BA type and the RO type. Both varieties are claimed to seal most liquids and gases at very high pressures, speeds and temperatures, the high pressures being accommodated by an ingenious method of pressure balancing. The main difference between the two ranges is in the matter of overall dimensions, the BA type being of comparatively small width, but requiring up to approximately ⅜ in. on either side of the shaft, the RO type being from 1⅛ in. to 2½ in. long depending on the shaft size, but requiring only about ⅜ in. on either side of the shaft. Both types of seal are normally supplied with bronze rubbing faces for use where there is ample lubrication, but can be supplied with faces made of *Resax*, a material specially developed for the purpose, when the lubrication is sparse or non-existent, in which case the references become CBA and CRO respectively. Both types can be supplied in stainless steel with tasteless rubber parts.

PIPELINES

A full range of argon arc electrically welded stainless steel tubes and cold rolled sections, produced under the trade name *Permbrite*, is now being offered by Rollo Hardy and Co., Ltd., who maintain a modern manufacturing unit in South Wales. Of immediate interest to those engaged in food manufacture and other allied activities is polished bore welded stainless steel tubing which is the latest addition to the family, although by no means the least important. This tubing is produced in sizes from ⅜ in. to 2½ in. o.d. in any of the austenitic grades of stainless steel, the polish obtainable, in lengths up to 20 ft., ranges from rough to mirror

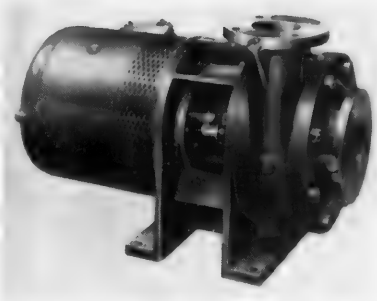


The Weston "Impax" seal type CBA fitted with faces made of Resax for bad lubrication conditions.

polish or super polish (500 grit). The makers say that the method employed ensures that the polish is consistent throughout. This new development will, it is claimed, enable users to reduce their own costs appreciably.

For applications where no internal polishing is necessary the company offer As-welded stainless steel tubing with a minute internal weld fin or bead (0·002 in./0·003 in.). The sizes produced range from ⅜ in. to 2½ in. o.d. in five grades of stainless steel. It is claimed that the wall thickness is uniform and that the physical properties of the material are not disturbed by excessive heat treatment, thus giving rise to excellent manipulative qualities and maximum corrosion resistance. Tubes are supplied either softened and descaled or externally polished to customers' requirements up to mirror finish. Other *Permbrite* products include open and tubular sections in stainless steels, mild steel and non-ferrous metals incorporating ovals, squares, rectangles, hexagons, angles, channels and special shape tubing to meet individual specifications. Inconel electrically welded tubing is also available to special order in sizes from ⅜ in. to 2½ in. o.d.

Markland Scowcroft, Ltd., say they hold large stocks of steel tube in scores of sizes for immediate delivery, including mild, carbon and stainless steel tube in various qualities. Exact cut lengths of tube, however short and in any quantity can be supplied at short notice, and against test certificates. A mechanical tube list is available on request showing all the sizes of seamless and E.R.W. tube held in stock up to 18 in. o.d. and wall thicknesses up to 1 in. A wide range of stainless steel tube, which is of particular interest to the food industry, is stocked up to some of the largest sizes made and available for immediate delivery in



The Safran centrifugal pump 4/5 in. model with 14 h.p. electric motor, and Unishaft drive (pump and power shaft are one), made by the Saunders Valve Co., Ltd.

either EN58B (F.D.P. quality 18/8/Ti) or EN58J (F.M.B. quality 18/8/Mo). This is normally supplied in the fully softened and descaled condition, but arrangements can be made for this to be polished if required. A wide range of stainless flanges, bends and fittings are also offered, as well as a wide range of steam fittings such as pressure gauges, level gauges and cocks. A comprehensive booklet has just been issued listing all of these complete with specifications, dimensions and prices. For many years the firm say they have specialised in the construction of tanks of all types and sizes and can arrange for these to be lined with glass, rubber, P.V.C., etc. for special liquids. They also make steel structures and weldments such as stacks, hoppers, bunkers, bedplates, machine frameworks, and supporting structures of most types.

William Chicken (KPZ), Ltd., supply *Kronprinz* tubes and pipes manufactured from corrosion, acid and heat resisting steels, in seamless, solid drawn, welded (not drawn), and weldrawn execution in all surface finishes from bright pickled to buffed. All tubes are claimed to be suitable for welding with heat treatment, or bending, expanding and other cold forming. Sizes in seamless are up to 4¼ in. o.d., in welded up to 20 in. o.d., and in weldrawn up to 5½ in. o.d., manufactured to B.S. and ASTM specifications.

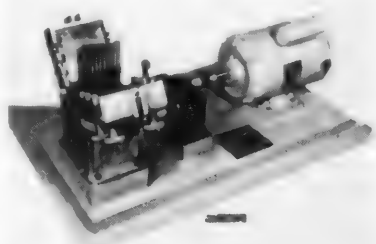
Heating mantles

To maintain pumps at raised temperatures, electric surface heaters are now available. The illustration shows a LaBour pump heated by an *Isomantle* enabling the pumping of materials which would be too viscous at normal temperatures, such as chocolate, glucose, etc. These heating mantles are produced by Isopad, Ltd., who say they have been specialising in the production of electric surface heaters for many years. Another of their products which they say has found wide application in the food industry, is a range of electric heating tapes. Chocolate is usally piped at a temperature of 110 to 130°F. and tracing of pipe lines by these electric heating tapes has been found a convenient means of keeping the chocolate at that temperature, avoiding completely any danger of local overheating which would cause burning or caramelising.

A wide range of these heating tapes is available between 36 in. and 240 ft. long and in different loadings per ft. The terminations are at one end and installation is therefore simple and quick. Other applications of this versatile heating method include road tankers heated by *Isopanels*, which allow the transport of chocolate and other material in the liquid stage over any distance; special *Isomantles* are used on production vessels of all shapes and sizes. Fully illustrated catalogues are available from the manufacturers.

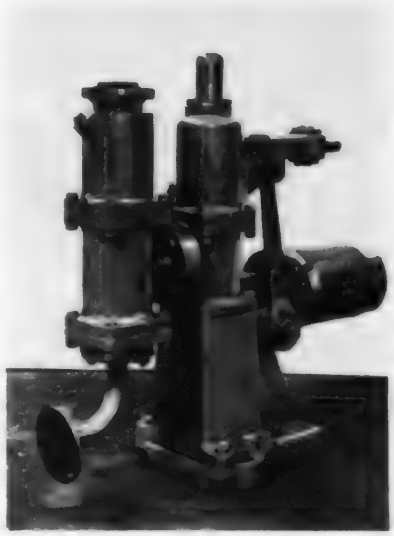
Protection and identification

The uses of *Scotch* brand pressure sensitive tapes, made by Minnesota Mining and Manufacturing Co., Ltd., in connection with pumps and pipeline equipment, fall into two main categories, *viz.* protection and identification. Among protective tapes is *Scotchrap* brand tape No. 50, which is



One of the newer developments of Apex Construction, Ltd., is this No. 192 chemical pump for liquids, gases or solids in suspension at easily variable rates and without contamination.

An Isomantle made by Isopad, Ltd., fitted to a LaBour pump enabling the pumping of materials which would be too viscous at normal temperatures.



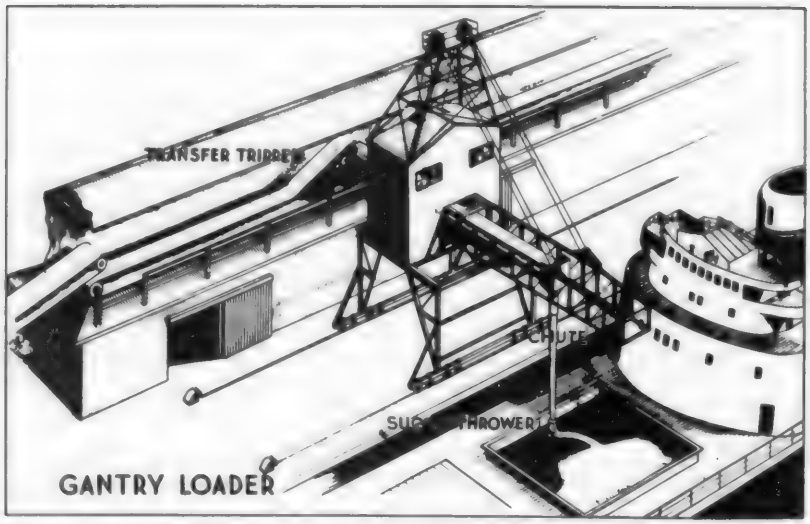
The latest model in the range made by Merrill Pumps, Ltd., is this size 6 in which the stroke can be varied while the pump is running.

a specially formulated P.V.C. tape with pressure sensitive adhesive that is claimed to make easy work out of difficult pipe, conduit and cable-coating jobs large or small. The makers say that the tough plastic resists abrasion above or below ground, resists corrosion from galvanic and electrolytic action, and is unaffected by most alkalis, acids, alcohols, oils, aliphatic hydrocarbons water, weathering and sunlight. The tight-sticking pressure sensitive adhesive requires no heating or activating. No applicating machinery is needed with *Scotchrap* although high-speed field-model applicators are available for straight-line work on big projects.

Scotch Brand *Pahlon* P.V.C. tape No. 688 has been designed for identification purposes. The tape is available in 15 different and distinctive colours, and can also be provided in printed roll form to suit individual requirements. It is claimed to be easy to apply, to have a high degree of comformability, to be moisture resistant, and also to have numerous uses in the food packaging field.

Denso, manufactured by Winn and Coales, Ltd., is a protecting material, based on a petroleum compound, with which a cotton fabric is fully impregnated and coated to form a conveniently handled roll of tape; it is also available as a mastic. It is claimed to be impervious to air, gas and water, and to be highly resistant to acids, alkalis and mineral salts. The makers say it never dries out or hardens, forms a pliable sheath which will withstand an appreciable amount of vibration and mechanical stress, and can be quickly applied over a wide temperature range

(*Concluded on page 255*)



The method of bulk loading of raw sugar into a ship's hold is shown in this drawing.

Bulk Handling of Sugar in Australia

By J. Grindrod

CAPABLE of loading vessels of 10,000 tons capacity mechanically in less than two days from the start of loading, compared with the old system of hand loading bagged sugar, which took some three weeks, the first mechanised bulk loading installation for raw sugar, at Mackay in Queensland, Australia, has now been operating for nearly two years.

Australia's sugar industry is being converted to bulk handling; this article describes the first of the large port loading installations to be built at Mackay, Queensland.

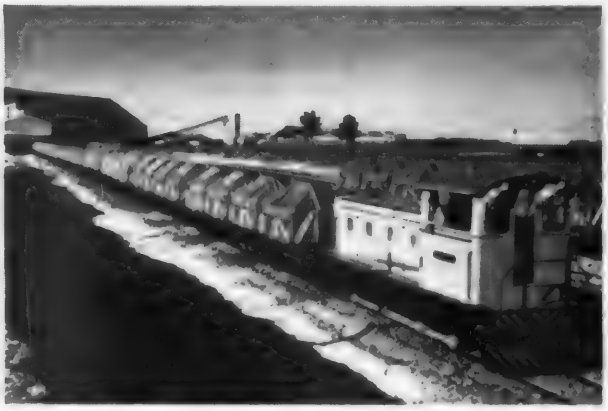
Within the next few years most raw sugar in Australia, whether for Australian or overseas discharge, will be handled in bulk without being bagged at any stage.

The conversion to bulk handling was begun in 1954 when relatively small bulk installations were completed at two of the Colonial Sugar Refining Company's mills in northern New South Wales, the bulk raws being mechanically handled from bulk storage into small coasting vessels, which were unloaded at the C.S.R. Company's Pyrmont refinery in Sydney by a coal unloading crane.

600 tons per hour

During 1955, a large-scale mechanised bulk unloading and receiving installation was completed at the Sydney refinery, while, at the company's Yarraville refinery at Melbourne, sugar was unloaded in bulk, using grabs operated by ship's gear. Apart from the New South Wales sugar arriving by small coaster, bulk cargoes for these refineries and for export destinations in the United Kingdom were loaded by bleeding bagged sugar into ships' holds at Queensland ports.

The present rate of loading is about 600 tons per hour of actual loading time, compared with about 65 tons per hour under the old system. The consulting engineers for the Mackay project were Macdonald, Wagner and Priddle, of Sydney, who engaged the Colonial Sugar Refining Company as their associate consultants to design and supervise all mechanical and electrical equipment in the installation. Constructed by the Mackay Harbour Board on behalf of the



(*Left*): **Rail delivery of raw sugar from the mills in steel-framed sugar boxes.** (*Right*): **Sugar being dropped from the shuttle conveyor at the apex of the main storage shed on to the floor.**

Queensland Sugar Board, the new terminal is now the main terminal for storing, loading and shipping about 250,000 tons of raw sugar each season. It is claimed to be the biggest bulk sugar loading installation in the world and it holds about 150,000 tons of raw sugar. It took three years to construct and cost £A1½ million.

150,000-ton store shed

Sugar is delivered in bulk to the terminal by rail and road and the installation can receive up to 500 tons of raw sugar an hour from the eight raw sugar mills in the district. That coming by rail is delivered in covered steel framed sugar boxes to the terminal siding. A locomotive marshalls the trucks into the receiving station where the sugar is weighed and side-tipped into a receiving hopper fitted with a bottom pan conveyor, which passes the sugar on to a belt conveyor and thence by way of a transfer tower and a further conveyor to the top of the main 150,000-ton storage shed whose capacity is sufficient to meet the needs of about two-and-a-half million people. The shed encloses four acres of floor space, measuring 1,000 ft. long and 150 ft. wide.

Shuttle conveyor

At the apex of the shed a shuttle conveyor, 80 ft. above the floor level and mounted on steel rails, distributes the sugar where required in the shed at the rate of 5 tons a minute.

Reclamation is by electric shovels into a line of 76 hoppers, let into the centre of the floor of the main storage shed, which feeds the raw sugar on to a 42 in. wide conveyor belt in a tunnel running the full length of the shed. The flow of the sugar from the hoppers is manually operated from the tunnel. The belt travels at the rate of 450 ft. a minute and delivers sugar to the weigh station in the precincts of the wharf at a rate of 600 tons an hour.

From the weigh tower, the sugar is taken by further belt conveyors to the mobile gantry loading station, where it is transferred by tripper on to the gantry delivery belt. A telescopic chute hangs from the boom of the 140-ton gantry loading crane and can be extended or retracted to cope with the 21 ft. tides experienced at Mackay Harbour. The sugar from the conveyors falls down the chute, at the end of which is a mechanical thrower or trimmer which can be rotated in a 360° arc to distribute the sugar to any part of a ship's hold, thereby doing away with the need for hand trimming.

The telescopic chute which loads and trims the ships' holds at 10 tons a minute.

One man, using a portable push button control board, operates the loader, which discharges the sugar into the holds at a rate of 10 tons a minute. The loader is mobile and traverses the full 500 ft. length of the wharf on rails.

Installations generally similar to that at Mackay have been built at the ports of Lucinda and Bundaberg. Installations at other ports will follow.

Pumps and Pipelines

(*Concluded from page 253*)

Use of PTFE

PTFE (Polytetrafluoroethylene) possesses complete purity, corrosion resistance (greater than either platinum or gold), non-absorption and non-stick properties which make it suitable for food use. It can be used for many components of food manufacturing machinery, such as piston cup packings, gland packings, U, V, O, and joint rings, cylinders, bushes and flexible bellows. All these items are manufactured by Crane Packing, Ltd.

Two specialised products, the CF_2 bellows pump and the *Fluoseal* are made by this company in both of which all parts that come into contact with the fluid are made from PTFE. The bellows pump is said to be suitable for handling very corrosive or very pure substances where service conditions are light. The *Fluoseal* mechanical shaft seal is designed for use with all concentrations of acids and salts, strong oxidising agents or reducing agents, and it is also said to be resistant to all organic compounds and salts. Really pure liquids or products where hygiene is of great importance can be handled by the *Fluoseal* without any danger of contamination.

Cathodic protection

Food processing equipment may be protected against corrosion by means of cathodic protection. Protection of this type of equipment presents many problems. Metal and Pipeline Endurance, Ltd., (MAPEL) are equipped to investigate specialised corrosion problems of this nature and to recommend methods for the mitigation of corrosion. Where the equipment handles foods it is of prime importance to avoid contamination. Under these conditions impressed cathodic protection is employed using platinum or plantinised titanium anodes. Processing plant frequently handles large quantities of water for cooling and other purposes. In these cases platinised titanium and silicon iron anodes are used for impressed current systems. Sacrificial anodes are often a convenient means of providing protection; zinc and magnesium are the principal metals employed. The MAPEL ultrasonic gauging service determines the metal thickness of plant without the need for complete dismantling. Thus the plant corrosion rate may be assessed and repairs and replacements accurately planned.

MAPEL also offer a welding inspection service.

▶Tool Treatments (Chemicals), Ltd., have published a catalogue of the *Black Knight* range of plastics items which they market. A section is included which deals with the effect of chemicals on polythene.

New Heinz Factory opened at Kitt Green

THE new Heinz factory at Kitt Green, near Wigan, was opened by the Lord Chancellor, the Rt. Hon. Viscount Kilmuir, G.C.V.O., on Thursday May 21. A month after the opening, on June 24, Her Majesty Queen Elizabeth the Queen Mother will pay a visit to the factory, accompanied by the Earl of Derby.

The new building is believed to be the largest food factory in the British Commonwealth and, complete with processing equipment up to stage one, cost approximately £7,000,000.

Mr. H. J. Heinz II, chairman of the H. J. Heinz Co., Ltd., presided at the opening ceremony which was attended by a large number of distinguished guests from all over the country.

The architects were J. Douglass Mathews and Partners, and the contractors were A. Monk and Co., Ltd. The building embodies many new forms of construction and up-to-date methods of factory planning and equipment. It is a fine example of contemporary architecture, a notable feature being the glass curtain wall 46 ft. high, which surrounds the whole

(Concluded on page 262)

Raw materials are brought in by means of an elevated approach to the warehouse and processed on the upper production floor. The cooked products are conveyed to the lower floor for canning or bottling and packing and returned to the finished goods warehouse to await despatch.

Aerial view of the new Heinz Kitt Green factory. The glass curtain wall on three sides of the building has more than 50,000 sq. ft. of glass and is the largest in the country.

(*Left*): **The end of the unloading platform for raw materials with the loading bays for the finished products below. Beyond the warehouse section of the factory can be seen the glass curtain wall of the manufacturing section and the bridge leading from the employees' services building.** (*Right*): **One of the battery of electronic eyes being examined. The eyes, each of which has 3 photo-electric cells, examine the beans individually and reject any whose colour is substandard. The equipment was specially developed by Devices, Ltd.**

CONSULTANTS—
their role in the food industry

Who are consultants? What do they do? How are their services obtained? These and other questions are answered by one of them, a Fellow of the Royal Institute of Chemistry, who says small firms underestimate the advantages of employing them.

THE earliest practising chemists concerned with the food industry were mainly public analysts and agricultural chemists; the comparatively primitive nature of processing made process control chemists almost unknown, and the chemistry of food was almost entirely confined to the analytical aspect. The Adulteration Act of 1860 made provision for the appointment of analysts but ignored the important question of standards. The early analysts had, therefore, not only to evolve their own methods but also had to draw up their own standards for assessing the freedom of a food from adulteration. The Food and Drugs Act of 1875 improved things a little. As time went on, firms began to call on the services of agricultural chemists and public analysts, who were accumulating much useful knowledge about food and the chemicals used in the food industry. In this way, consultant chemists as we know them today came into existence.

As chemistry developed, the larger firms began to establish their own laboratories, and it was prophesied that the day of the consultant was over. On the contrary, consultants today are playing an ever more important part in industry, and their numbers are increasing. The Directory of Consultants of the Royal Institute of Chemistry contains nearly 200 names, the corresponding directory of the Institute of Biology already lists more than a dozen full-time independent consultants, and the newly formed Association of Consulting Scientists already has over forty members. It is evident, therefore, that there is scope for the consultant in industry today.

Types of consultant

Consultants fall into two broad categories, the "public analyst" or "all purposes" type who hold official appointments as public analysts, and the "specialist" or "technological" type who specialise in one or sometimes a few inter-related fields. The first group, by reason of their office, are Fellows of the Royal Institute of Chemistry in Branch E—Analysis of Foods and Drugs. The second usually do not possess the Branch E qualification and many of them start as consultants rather later in life. They nearly always have had great experience as technical director, chief chemist or senior chemist in a large firm, or they have been on the staff of a research institute or association. Some have had previous experience of both academic research and industrial process control, and such combined experience is a great asset to this type of consultant. Now that science is advancing at such a rapid rate, specialisation is the rule, and although there may always be room for a few "general utility" consultants who maintain laboratories for general analytical purposes, the scope for these in the future seems to be very limited, and in the writer's opinion the vast majority of all independent consultants in the future will be highly specialised.

How to choose one

It can be assumed today that practically all consultants possess academic qualifications in the fields in which they work. Many possess higher degrees and a few have a distinguished research career. A high academic qualification does not make a man a good consultant, but it would be wise to look closely into the claims of any consultant who is not a member of his professional institute. Assuming the possession of qualifications, the most important requirements are integrity and experience. No consultant can do his best for a client unless he is in possession of all the facts of the problem, and this means that highly confidential information has to be divulged to him, not only about present conditions but about future policy. Integrity is, therefore, an essential qualification. It may happen that the consultant approached is already retained by another firm for the same problem, and etiquette then demands that he withdraw from the work. In such a case, a consultant will often suggest the name of a colleague. All discussions between a client and a consultant are confidential.

No consultant can have too much experience; only this can bring "know-how" and it is really for this that a client pays a fee. It follows that consultants are not usually young men. Unlike a research worker who is usually in his prime between the ages of 30 and 40, a consultant is usually at his best after that age. It is therefore a great advantage if the consultant has occupied a full-time appointment in the industry concerned for some years. When making a choice between two consultants, the nature of the work should always be considered; if "research" rather than "industrial," the more research-experienced consultant should be employed, and vice versa.

The best and easiest way to obtain a consultant is by per-

sonal recommendation. A man who has been successful in advising one firm will probably be successful for another, provided, of course, that the problem is within his scope. Consultants do not advertise, and the vast majority gain their clients by their reputation or by recommendation. Large firms who have scientific staff will have no difficulty in approaching a suitable consultant, but a small firm, or one entering a new field, may need assistance, and in these circumstances the best procedure is to write to the Royal Institute of Chemistry, 30, Russell Square, London, W.C.1; the Institute of Biology, 41, Queen's Gate, London, S.W.7; or the Association of Consulting Scientists at 15, Hawthorne Road, Bromley, Kent, giving a brief outline of the work involved. The institute will then send its enquirer its Directory of Consultants, which gives some information about the specialised fields of those listed.

The institutes naturally will not recommend only one consultant, and it is not unreasonable then to ask each consultant what is his experience in the particular field, and to choose accordingly. Alternatively, a preliminary discussion may be arranged, and such preliminary consultations are usually given without fee. It should be borne in mind, however, that the consultant can hardly be expected to divulge "know-how" during such an interview.

Another aspect to be considered is the laboratory work. If much is involved, only a consultant who is equipped to do this sort of work should be employed, unless there is good reason for the contrary. This difficulty can readily be overcome, however, by the sub-contracting of analytical work, and this method is on the increase. Obviously, if only advice and information are required, laboratories are unnecessary, and a manufacturer should always make clear whether he requires general advice and comments on policy.

An enthusiastic client may have little knowledge of his particular problem; if there is no market for a proposed product, for example, or a process is fundamentally wrong, a good consultant will say so immediately. This may sometimes give offence, but independent views should be expressed without fear or favour.

Negotiations and agreements

Broadly speaking, there are two main types of first meeting between a manufacturer and a consultant. The discussion may be purely exploratory during which the client outlines the problem and the consultant states whether he is prepared to take on the work and, if asked, what his fee would be. Most consultants do not charge a fee for this type of consultation. Alternatively the client may ask for "preliminary advice and information" which may be verbal, and he must then naturally expect to pay an appropriate fee. A third method sometimes adopted is for the client to ask for a preliminary report on a scheme, to include a rough factory lay-out, services required, equipment and methods recommended, market possibilities, and so on. This will usually take a few weeks to prepare and an appropriate fee is charged. This method has the advantage that the manufacturer gets a competent opinion and outline scheme for a fixed figure, and there is no further obligation on either side.

If the manufacturer decides to engage a consultant the best arrangement is usually an annual retaining fee which will vary according to the services which the consultant will be required to give. At the lowest level the client will receive advice by telephone or letter, and an occasional consultation. Small retainers are usually unsatisfactory, for the simple reason that if a consultant is employed it pays to choose a good one, and use him to the full. Merely to pay a fee for the sake of saying that "X is our consultant" and to use him for window dressing is unsatisfactory for both parties. This practice is fast dying out. Manufacturers are usually hard-headed business men who want expert advice on their problems. They are prepared to pay good fees for good results, and a consultant, like anyone else in a business, must be able to pull his weight. He must not only know the answers, but he must be able to give the answers quickly in a language that the client understands. For the medium range of retaining fee the client can expect regular advice and information by telephone, letter and consultation, occasional visits to factories and possibly some laboratory tests. For the upper range a client can expect regular consultations and visits to factories, and a reasonable amount of laboratory work.

Sometimes a consultant will agree to put in a specified day or half day every week at the factory. Whatever method is adopted, it is essential that a proper arrangement be made, either by a contract or exchange of letters. The nature of the work the consultant is expected to do should be specified, and if the firm makes more than one type of product, the scope of his responsibilities should be stated. The financial arrangements about laboratory work and out of pocket expenses should also be put on a proper basis. Sometimes it is not possible for a manufacturer to say how much he will require from a consultant. The simplest arrangement is then a quarterly retainer which can be adjusted from quarter to quarter in the light of experience. Some clients prefer to "pay as they go." This method has certain drawbacks. The consultant has to keep a record of everything, and the client may unwisely refrain from asking the consultant to do too much for economy reasons. The big advantage of the retainer arrangement is that if the manufacturer runs into a bad patch he can call on his consultant unstintingly for help without worrying about any extra expense.

Retaining fee arrangements sometimes involve a series of quiet periods interspersed with very hectic periods. The system is thus basically the same as an insurance scheme.

Economic aspects

A small firm without a chemist and laboratory will find it a good proposition to employ a consultant both for scientific advice and analytical work. Even the smallest type of works laboratory with one qualified chemist and one assistant will cost a few thousand pounds a year today. By employing a consultant who can fulfil the necessary functions there can be a great saving, for the consultant's fee will be considerably less. Sometimes a laboratory and chemist at the factory are essential—it all depends on the nature of the work. It is of interest that the very largest firms frequently employ consultants, for some or all of the following reasons: to call on highly specialised knowledge for a particular aspect of a problem; to obtain an outside opinion; to take care of enquiries on a subject which only occur from time to time; to act as an expert witness in legal cases; to make highly specialised analysis only required occasionally; to carry out a "rush job" or investigation which is only likely to occur once; to help out in cases of illness, absence of staff, refitting of laboratories, etc.; to do work which is outside the normal operations of the firm's laboratory.

Sponsored research schemes have become popular in recent years. The consultant finds one or more scientific workers, provides laboratory accommodation, buys any special equipment which may be necessary, trains the workers in techniques, supervises the research, and sends in reports at agreed intervals. The client pays an inclusive fee for these services and may take over the scientific staff at the end of the agreed period. This scheme has obvious advantages for firms undergoing expansion.

Legal work: the expert witness

The complexity of the modern food laws (see, for example, O'Keefe's "Bell's Sale of Food and Drugs," 1957) makes it imperative for any firm in the food industry to be constantly on the alert. One of the most important duties of a consultant in the food industry today is to protect his client who can very easily break the law unknowingly. The following are the main types of offence:

(a) failure to comply with legal compositional standards.
(b) offences under Sect. 2 and other parts of the Food and Drugs Act.
(c) offences under the many regulations of the Act, particularly The Labelling of Food Order.
(d) adulteration, which means more than its apparent sense.
(e) use of forbidden or undesirable food additives.

In addition, litigation may arise in which scientific facts and opinions are involved. Only a fool goes to law if he can possibly avoid it, but there are occasions when legal proceedings are unavoidable. The three most common types are prosecution of firms by local authorities, those arising from actions by one firm which seriously harm another, and patent cases.

Collaboration between consultants

Consultants frequently work together, both in the same and in different fields. The reason is simply that a problem may require different sorts of knowledge or experience. The commonest are a combination of a chemist and a microbiologist, and a chemist and an engineer. If a problem in food technology involves two distinct types of food *e.g.*, cereals and meats, dairy products and fruit extracts, beverages and flavours, it will usually be advisable to employ a specialist in each field. If, therefore, a consultant suggests calling in another consultant, the manufacturer should not suspect a conspiracy to find more work for consultants. The client will get more efficient service more quickly at the same cost, for a fee quoted for any particular job will then be shared between them by arrangement.

A consultant may call on more than one colleague for specialist items; this "farming out" is a well recognised procedure, and enables one man to call on the skill of several.

Ethical aspects

Like other professional men—doctors, lawyers, architects—consultant chemists do not advertise, and this is the reason why the services which consultants can offer are not better known to manufacturers. It is always necessary for a client to make the first approach to a consultant. A man who has a good reputation should not find it necessary to advertise. However the directories of the professional institutes are not nearly widely enough known in industry. Business men, and even chemists, are frequently unaware that these directories exist.

Common fallacies

Probably the commonest fallacy held by business men is that consultant chemists are very clever analysts who work only in their laboratory, and by analysing things can solve all technical problems. Many amusing examples could be quoted. The writer himself has received a small piece of food screwed up in a paper bag with the magic words "Please analyse" written on the bag, no other information being provided. Another belief is that employing consultants is an expensive luxury. Of course it can be if things are done the wrong way. If the manufacturer does not get value for money it is usually either because he has not co-operated properly with the consultant, or has gone to an unsuitable consultant. Some men are reluctant to take advice, and prefer to be their own lawyer, accountant, chemist and so on. Any one of these can easily be worth his fee by saving his client from only one serious mistake. Small firms think carefully before deciding to pay even a small retaining fee to a consultant. A scheme which is worth trying is for a few small companies in the same area to retain a consultant for general purposes on a group basis. It would be unlikely that all would run into trouble at the same time.

Machinery and Equipment

POLYTHENE TANKS

Moulded polythene tanks are now available up to 60 gal. capacity and a 100 gal. model will be available shortly from White, Child and Beney, Ltd.

The tanks are made either in flexible polythene or in high density polythene (rigid grade), and are free standing in the latter quality. They are moulded in one piece; and have no welds, seams, joints or rivets. Being polythene they are stated to be particularly suitable for the storage of alkalis, salt solutions and most acids.

MULTI-MOVEMENT LIFT

Sacks, barrels, open containers, unit loads of all kinds, can not only be rapidly raised or lowered any distance, but will be automatically swung safely clear of any obstruction on the way, according to the makers of the latest addition to the range of Mackaness loaders. Named *Dumbo*, this auto-turning load lift is being manufactured by the Service Engineering Co., Ltd.

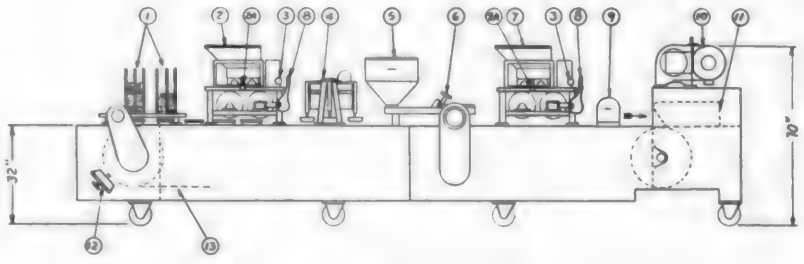
The lifting platform rises as soon as a load is placed on it. It stops automatically at any required height, and turns laterally through 180° (or less) to suit the needs of individual applications. Thus the load can be offered at a receiving bay at any floor level or taken on from there to another floor, being swung clear of any ramps protruding from intermediate receiving bays, but returned to well within the floor area of unloading and loading points. It can continue this operation from floor to floor.

The loader can be fixed permanently outside a building or installed indoors where it can pass through apertures in each floor. For discharging into hoppers the lifting platform can be made to invert itself after having swung automatically over the hopper. In this case, of course, the container would be secured to the platform.

The loader is available in three models: *Minor*, *Junior*, and *Senior*. In these models its lifting capacity is 2 cwt., and it is claimed that with a *Dumbo* two men can load 400 sacks an hr

The *Minor* will lift stacks to shoulder height, the *Junior* will raise to 6 ft. 6 in., and the *Super* (particularly suitable for warehouses) has a 20 ft. lift for high stacking. The manufacturers state that delivery of standard models can be made *ex* stock.

The loader is mobile, the undercarriage being mounted on four rubber-tyred wheels. Front wheels are interconnected and are of the self-steer type. Raising, lowering, lateral rotation, and, where required, inversion of the lifting platform, are fully automatic, powered by a fully enclosed electric motor with worm reduction gear box and cable winding drum.



The *Kohler Pie Master* piemaking machine sold by Mayfair Products Co., a U.S. firm, is capable of producing upwards of 50 eight-in. pies or upwards of 160 four-in. pies per min. (1) Pie plate magazine holds two stacks for large size pies and four stacks for small size. (2) Assembly for rolling the bottom crust dough in a continuous ribbon with adjustment control at (2A). (3) Automatic flour duster for one roller only. (4) Automatic setter for placing dough in plate. (5) Adjustable filling machine with a stainless steel hopper of approximately 200 lb. capacity. (6) Weight adjustment. (7) Top crust roller assembly. (8) Pie crust thickness adjustment. (9) Automatic trimmer, crimper and marker. (10) Variable speed gear head motor. (11) Automatic pie ejector. (12) Removable plate holders with pie lifters. (13) One-in. conveyor roller chain with conveyor flights and safety covers made of stainless steel. The machine occupies 5 ft.×24 ft. floor space.

TRACTION UNIT

A self-contained battery traction unit, known as the *Hydriver 20*, which can be fitted to any hand propelled equipment was introduced recently by H. C. Corbett and Co., Ltd. The tug is capable of moving loads of up to 2,000 lb. on roller bearing steel wheels at a speed of up to 2 m.p.h. and has a drawbar pull of up to 100 lb. on smooth, dry, level concrete.

The "Hydriver 20" self-contained battery traction unit newly introduced by H. C. Corbett and Co., Ltd.

The motor and gear drive are totally enclosed and the machine is fitted with a *Duthane* tyre. Safety features of the machine include a handle which carries two inter-connected twist grip controls for forward and reverse travel, the handle returning to an upright position when released, and an electrostatic brake which is applied automatically when the twist grip is released or returned to the neutral position.

HYDROSTATIC COOKER/COOLERS

A continuous steriliser employing the hydrostatic principle in which the steam pressure in the steam compartments is balanced by one or more water columns (water seal) is produced by Stork and Co. Apparatenfabriek N.V., Amsterdam.

The height of the water columns in the machine depends on the steam pressure and temperature required for the sterilisation of the products to be processed. The height of the columns can be controlled by means of overflow valves and consequently the sterilising temperature can be regulated between 212 and 250°F.

The main advantage claimed for this principle is that the cans are carried through a water seal into and out of the steam compartment without being hampered by complicated and mechanical sluices.

Leonard Smith (Engineers), Ltd., are the U.K. representatives for the makers.

STAPLING MACHINE

Two models of stapling machine, *M* and *SHD*, have been introduced to this country by Industrial Stapling and Packaging, Ltd., who say that they use a minimum number of staples for top and bottom sealing of cartons. The firm say that only four large size staples are necessary for sealing the centre seam of the carton.

The model *M* is a manually operated machine which has been designed primarily for the sealing of filled cartons. It can also be used for bottom sealing of empty cartons from the outside by placing two rods in the form of a cross beneath the open flaps and then closing the flaps before stapling.

Machines are made for three different sizes of staples with penetrations from $\frac{1}{4}$ in. to $\frac{5}{8}$ in. to allow for different thicknesses and qualities of board; each will hold just over 100 staples.

Overall height of machine is $11\frac{1}{2}$ in., length is 1 ft. and width $5\frac{1}{2}$ in. It is made of stainless steel, and has a red plastic handle with a red anodised nosepiece.

The *SHD* is basically similar to *M* but is of heavier construction. It has similar dimensions except that the overall height is 1 ft. 1 in.; there is also a carrying handle in place of the nosepiece.

POWDER FILLERS

Powder filling equipment made by Perry Industries, New York, has been added to the range of filling equipment available from the Flexible Metal Co., Ltd.

The Perry *Accofil Lab Guns*, which are operated by a patented vacuum-pressure principle, consist basically of a cylinder and adjustable piston combination in which a vacuum pressure cycle is introduced. The piston can then be adjusted, it is said, to get the exact fill required.

In operation, the gun is adjusted to the fill required, the nozzle inserted into the bulk powder container and it sucks up the amount required. The operator then inserts the nozzle into the vial or container being filled and presses a foot pedal and a slug of powder is deposited.

Two models of the machine are available: a console model, 19 in. long × $19\frac{1}{2}$ in. deep × 38 in. high, and a table model, 14 in. long × 12 in. deep × 12 in. high.

A Perry "Accofil Lab Gun" being used to fill small canisters with powder from the bulk container on the left.

Flexile intend introducing the complete range of Perry machines which include a liquid filling and stoppering machine, a semi-automatic powder filling machine (for aerosol filling), a high speed filling and stoppering machine (*LFS*) and other machines.

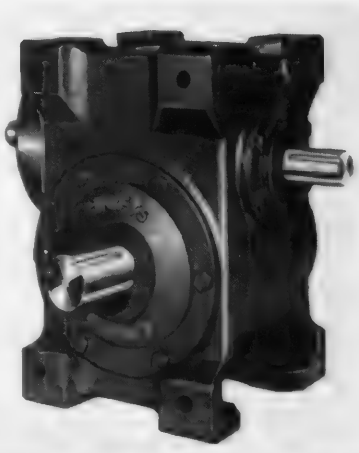
A new large size variable flow indicator in the "Arkon" range made by Walker, Crosweller and Co., Ltd.

FLOW INDICATORS

Walker, Crosweller and Co., Ltd., have extended the range of their *Arkon* variable flow indicators. These instruments can be adjusted for high or low velocities of flow and now include sizes $1\frac{1}{4}$ in., $1\frac{1}{2}$ in. and 2 in., in addition to $\frac{1}{2}$ in., $\frac{3}{4}$ in. and 1 in.

These indicators have a complete cartridge assembly which is interchangeable between the different sizes. The spindle impeller assembly, which is fitted in a cartridge housing, may be easily removed and reset for the required flow range.

The indicator has a chromium plated ring at the top of the spindle under a toughened glass dome which stops spinning if the flow stops.



The Crofts universal worm reduction gear can be used in up to 50 different mounting positions and different arrangements of input and output shafts.

GEAR UNITS

Two new types of gear units have been introduced by Crofts (Engineers), Ltd. The primary feature of both is said to be their adaptability to a wide variety of mounting positions, shaft dispositions and ratios of speed reductions.

The first, the *Crofts* universal worm reduction gear unit, can, it is claimed by virtue of its standardised design, be used in up to 50 mounting positions and different arrangements of input and output shafts.

The second item is the *Crofts* helical gear unit which the makers say is also by virtue of its standard design adaptable to any installation in any mounting position and for any combination of gears or shaft arrangement.

ELAPSED TIME INDICATOR

Cass and Phillip, Ltd., have developed a new sealed and insulated unit which they say will greatly extend the range of applications for which elapsed time indicators are suitable. Basically, the new version is designed with a double-skin instrument case, the mechanism being mounted internally on beryllium copper-leaf springs. The balance staff, balance wheel and armature assembly are jewel mounted.

The four leaf springs, spaced 90° apart, carry the complete mechanism, which is then inserted in a polythene case, the springs being located in grooves moulded in the case. This assembly is then installed in a steel outer case, and electrical contact is made through insulated terminals in the rear.

Apart from being completely sealed against ingress of water and dust, the instrument movement is electrically insulated from the case, and the case does not provide a connection to earth as on earlier models.

Advances in Food Technology

ANALYSIS

Residue Determination

Allethrin may be determined colorometrically in meat or milk by extraction with light petroleum (boiling range 20-40°C.), removing the solvent and reacting with $HgO-H_2SO_4$ reagent. Allethrin gives a red colour and the chrysanthemum-monocarboxylic acid component of allethrin, in the free state, gives a pink to purple colour.

Allethrin was not found in the milk of cows sprayed daily for three weeks with allethrin in oil, or in the muscle, heart, kidney or fat of a female goat sprayed daily for five weeks. In both cases, the concentration of allethrin used was much in excess of that normally employed.—D. B. McLellan and J. B. Moore, *J. Agric. Food Chem.*, 1958, **6** (6), 463.

MEAT PRODUCTS

Pork Sausage for Freezing

The Danish Meat Research Institute at Roskilde has carried out research on various factors affecting the keeping quality of frozen pork sausage meat. These factors included the degree of comminution of the meat as well as its contents in salt, flour, glutamic, and gallic compounds. Packaged in aluminium foil, the sausages were kept in cold storage, at temperatures ranging from −18 to −20°C., for periods of one week, two, four, and seven months, before being subjected to organoleptic examination. The keeping quality was found to be best with coarsely ground sausage meat. Quality after four months was improved if 5% flour and/or 0·02% ethyl gallate had been added to the meat, but was not improved by an 0·15% addition of sodium glutamate. Where no salts had been added, off flavour was largely avoided, but the texture was adversely affected.—J. Wismer-Pedersen and A. Sivesgaard, *Die Fleischwirtschaft*, 1959, **11**, 25.

Discoloration of Dry Sausage

The Institute for Bacteriology and Histology of the German Federal Meat Research Institute, Kulmbach, was called upon to investigate a case of large-scale discoloration of dry sausage which had occurred in a long-established factory in South Germany. The phenomenon was traced to the following causes: The meat had not been allowed to mature long enough; too much sugar was used; the ageing temperature was probably temporarily too high. Moreover, there was a high initial contamination with lactobacilli, probably due to faulty temperature control.

The following measures were recommended, and proved successful: (1) The meat must be kept at a temperature of between 0 and +2°C. until it has aged sufficiently. (2) The maturing temperature must not be allowed to exceed +18°C.; the maturing period must be extended to three days, and the sausage subsequently smoked at 18 to 20°C. for two to three days. (3) Back fat must be frozen at −8 to −10°C. (4) Remnants of other lots must not be added, and the temperature in the storage room must not be allowed to become too high. (5) All tools, objects, etc., must be regularly cleaned and disinfected.—K. Coretti, "*Die Fleischwirtschaft*," 1958, **10**, 829.

MILK

Viscosity and Adulteration

The decrease in the viscosity caused by the addition of water to either cows' or buffaloes' milk has been measured with an Ostwald viscometer.

Six samples of cow milk which had been diluted with 25% of water showed an average loss of 15·6% of their initial viscosity. Buffalo milk, 16 samples of which were diluted to the same extent, showed an average loss of 19·2% on their initial viscosity. The ratio of total solids and solids-not-fat and the viscosity of the fat were thought to be useful criteria of adulteration.—P. S. Kulkarni and K. K. Dole, *Indian J. Dairy Sci.*, 1958, **11**, 36.

FOOD IONISATION

Food Preservation Through Irradiation

In contrast to the United States, where the U.S. Army is carrying out large-scale experiments with irradiation of food by an electron accelerator or a gamma source, ionising radiation of food is still prohibited in Germany. But the potentialities of this method are recognised, and further research to clarify the problems involved is called for. Among the objectives are: the sprout prevention of vegetable products; insect control; destruction of parasites; pasteurisation and sterilisation; destruction of micro-organisms which spoil the food or are detrimental to health. Other problems concern the inactivation of enzymes; chemical effects of irradiation; packaging of irradiated foods; health questions and economic questions—J. Kuprianoff, *Die Fleischwirtschaft*, 1959, **11**, 177.

DYES

Influence on Acid Production

Tests were made with 37 dyes (including some not used in foodstuffs) mixed in concentration of 0·3 to 1% with separated milk inoculated with buttermilk containing lactic acid bacteria. The amount of lactic acid formed is determined after 24, 48 and 72 hr. by electrometric titration.

The dyes are classified as strongly inhibitory (basic dyes, *e.g.*, malachite green), moderately inhibitory (*e.g.*, eosic and erythrosin) or, in low concentration, moderately stimulating. Examples given of the last group are acid green and alizarin respectively.—J. Eisenbrand and A. Klauk, *Z. Lebensmittl Untersuch*, 1958, **108**, 225.

Heinz Factory

(*Concluded from page 256*)

manufacturing area and is 1,080 ft. long. The whole factory is so designed that raw materials (some of which are grown locally in the rich agricultural land of the Ormskirk Valley) can be delivered by means of an elevated approach road direct to the second floor of the factory, where a scheme of continuous production begins which eventually delivers the finished product in can or bottle for despatch from the ground floor.

The factory which stands in open country on a 150 acres site, has a total floor space of 833,600 sq. ft. It has been designed throughout with future expansion in mind. When it is running at full load, the factory will employ about 3,000 people in surroundings probably among the finest of any factory in the country. Particular attention is paid to the welfare of the employees. There is a separate employees services building containing canteen, kitchens, cloakrooms, medical and dental departments, personnel office, "57 Club" premises, staff sales shops, etc. Ample provision is planned for sport of all kinds in the company's sports field adjoining the factory.

News Digest

Sir Owen Wansbrough-Jones (second from right) talks to K. L. Whitehead, Manager of *Corrosion Technology*, on the Leonard Hill Technical Group stand at the Corrosion Exhibition. The others in the picture are (from left to right), Mr. W. Leonard Hill, R. G. Paterson (Editor of *Corrosion Technology*), and on the extreme right, Ernest Hill, Manager of *Chemical and Process Engineering*.

Second Corrosion Exhibition Attracts World Wide Interest

Corrosion Technology's second Corrosion Exhibition, held in London's New Horticultural Hall last month—April 27-30—was 50% larger than the first held in 1957, and attracted over 11,000 visitors, many from overseas. By the second day visitors from abroad included Americans, Belgians, Canadians, Danes, Dutch, Egyptians, French, Finns, Germans, Indians, Israelis, Italians, Norwegians, Nigerians, Russians, South Africans, Swedes and Swiss. Exhibitors and visitors alike agreed that the exhibition was highly successful, and a number of new products were displayed for the first time.

The Exhibition was opened by Sir Owen Wansbrough-Jones, K.B.E., C.B., Chief Scientist of the Ministry of Supply, who in his opening address said that although the cost of corrosion to the world and to individual countries was very difficult to assess, a figure for this country equivalent to 2s. in the £ on the standard rate of income tax had been widely quoted. In this country we have a hideous moist climate, an extensive coastline and still regrettably a great deal of atmospheric pollution. He wondered whether the most significant aspect of corrosion was not more subtle than the direct monetary loss; more important might be losses in reliability, extra costs in maintenance, extra wear in mechanical equipment and so on. It is these aspects of corrosion, said Sir Owen, that the scientist can next tackle best. He concluded by saying that a world without corrosion was not only unthinkable but even in the distant future might benefit from the encouragement of controllable corrosion, and he could foresee the possibility in the end of some calculated use of controlled corrosion.

World fat production up by 50%

Annual world production of fats and oils used for food has increased by 9 million tons in the past 10 years, according to the Food and Agriculture Organisation, Rome. Production was 28 million tons in 1958, about 50% more than the average pre-war level. Major increases were registered in the U.S.A. and the U.S.S.R.—about 2 m. tons each. Increases elsewhere have been: Western Europe 1·1 m. tons; China, India and the Philippines 1 m., Africa 700,000; Latin America 600,000; and Eastern Europe about 500,000 tons. According to official statistics available, the U.S.S.R., with an average annual rate of increase of 18%, led the world during this 1948-58 period, followed by Eastern Europe with 11%, the U.S.A., Latin America and the Philippines with 5%, Western Europe and Africa with 4%, China and India with about 1%.

In Western Europe the source has been mainly animal; in Africa, oilseeds and groundnuts (peanuts); and in the U.S.A. soya beans. Copra has been the source in the Far East and in comparison the one which expanded most, despite a recession in the past two years.

World consumption in the period 1955-57 was about 11 kg. per head as compared with 10 kg. in the pre-war period and until the early 1950s. But consumption still differs greatly from region to region, ranging from 5 kg. per person in Africa and Asia to 10 kg. in Latin America, probably 13 kg. in the U.S.S.R., 23 kg. in Western Europe and 27 kg. in the U.S.A. About three-quarters of the world's population live in the low fat-consuming areas but the rise in consumption in these underdeveloped regions has been much more rapid than in others. Consumption in the U.S.A. and, perhaps, in certain countries of north-west Europe may be near to limit for the present populations.

PEOPLE

MR. ALEC TAYLOR, manager of the *Cellophane* sales division, British Cellophane, Ltd., has been appointed a director of the company. A graduate of Manchester University, he joined British Cellophane, Ltd. in 1938 as a general trainee. He became personal assistant to the commercial manager in 1950 and assistant sales manager two years later. In 1954 he assumed the post of sales manager, and in 1957 was appointed to the executive committee of the company.

Mr. Taylor, a fellow of the Royal Statistical Society, is 43.

■

MR. ALBERT NORTON has been made a director of Rowntree and Co., Ltd.

*

MR. R. E. HUFFAM, who recently retired from the board of Unilever, Ltd., has joined the board of A. Boake, Roberts and Co. (Holdings), Ltd.

*

MR. T. A. IANSON has been made a director of Goldhanger Fruit Farms, Ltd.

*

MR. I. E. WILLIAMS has been appointed secretary of Quickfit and Quartz, Ltd., in succession to Mr. J. C. Steer, who has resigned.

*

MR. F. D. MURRAY has been appointed general manager of R. H. Corbett and Co., Ltd. He was formerly sales manager for Salisbury Precision Engineering Co., Ltd.

*

MR. L. R. KITCHINGMAN has been appointed production manager of the Handy Foods division of T. Wall and Sons, Ltd. Previously, for three years, he had been manager of the product development and quality control departments of the meat division. He joined the firm in 1948 as manager of the cooked meats and canning department.

■

DR. FRANK WOKES, B.SC., PH.D. F.R.I.C., recently retired from the directorship of the Ovaltine Research Laboratories. He joined the Berne headquarters of the Wander organisation more than 30 years ago.

At a farewell presentation ceremony, the staff of A. Wander, Ltd., congratulated Dr. Wokes on his achievements in establishing and developing the research laboratories and wished him every success in his new sphere of activities, which includes the establishment of a research laboratory at Stanborough Park for vitamin investigations.

DR. C. W. PICARD, M.SC., PH.D., F.R.I.C., is the new director of research and development.

Mr. A. Taylor

Mr. M. Merrick

Mr. P. Stephens

Mr. D. G. Gillies

MR. M. MERRICK, J.P., has been appointed managing director of Tyne Brand Products, Ltd. He has spent his entire working life with the company which he joined in 1925 as an office boy. In 1939, he was made assistant works manager and promoted to factory manager in 1942. He became works director in 1954 and joined the board in 1957.

Mr. Merrick will continue his duties as production director in conjunction with his new office.

■

DR. P. GARRICK has been made a director of William Evans and Co. (Hereford and Devon), Ltd. He is well-known as an expert on pectin and he first became interested in its biochemistry when working at the Rothamsted Experimental Station at Harpenden.

*

MR. HERBERT BARBER has been elected a director of Hugon and Co., Ltd.

*

MR. WILLIAM K. GREGSON has joined Short and Mason, Ltd. as the northern area representative. He will operate from: 32, Park Road, Sale, Ches.

*

MR. CYRIL ARTES, F.G.I., has been appointed general representative and marketing adviser in Britain of the Norwegian Canners Association.

■

Among the elections made at the a.g.m. of the Mineral Water Engineers Association were: chairman, MR. LESLIE CLARKE, M.B.E. (Bratby and Hinchliffe, Ltd.); vice-chairman, MR. A. J. MEADOWCROFT (W. Meadowcroft and Sons, Ltd.), and; hon. treasurer, MR. J. S. CLAYTON MARSHALL (George S. Clayton, Ltd.).

■

MR. W. WILSON of Shaws Biscuits, Ltd., who has been responsible for Northumberland, Durham, Cumberland and Westmorland, has taken over control of the whole Northern area including the North Midlands, Yorkshire and Lancashire.

MR. W. VAULKHARD will handle Cumberland, Westmorland and the Furness area.

MR. PETER STEPHENS has been appointed sales manager, northern area by Autopack, Ltd. At the end of the war, he joined the staff of East African Breweries, Ltd., Nairobi, and remained with them for 9 years.

In 1956 he returned to the United Kingdom.

*

MR. D. G. GILLIES, sales manager of the process engineering division of Alfa-Laval Co., Ltd., has been made a director.

*

MR. A. H. ELKS, general production manager, has been made a director and MR. H. C. WILSON, B.SC., has been appointed development engineer to Munton and Fison, Ltd.

*

MR. IAN HENDERSON has been appointed London sales manager for Eskimo Foods, Ltd., after three years as frozen foods sales manager with J. Bennett, Ltd., wholesale fish merchants, who are also in the Associated Fisheries group. He succeeds MR. R. H. C. GRIMSHAW who is leaving Eskimo, after ten years, to become sales director of J. Muirhead, Ltd., importers and brokers of quick frozen foods.

■

MR. MICHAEL J. SMEDLEY, eldest son of the chairman of the Smedley group of canning and quick freezing companies, has been made a director of Smedley's, Ltd. He will continue in his present capacity as director of market research and sales development.

*

MR. G. A. BEANLAND has been appointed sales promotion manager for Peerless and Ericsson, Ltd. He was educated at Leamington College, Leamington Spa. His first appointment was with Bass Ratcliffe and Gretton, Ltd., the brewers. In 1954, he joined the catering sales division of Carters of Coleford, manufacturers of *Ribena* and *Quosh* products, and was appointed Midlands representative for the firm.

For the past two years, Mr. Beanland has been catering manager for Anglo-Swiss Food Products, Ltd., in London, and was in charge of the catering division marketing *Knorr* soups.

Food in Parliament

The Royal Navy may live to a far greater extent off frozen foods in the future. Now under investigation by the Admiralty is the possibility of making wider use of such food in H.M. ships. The question arose in the Commons when Miss Joan Vickers (Cons. Devonport), inquired about the cold storage accommodation available at the big naval dockyard in her area for supplying ships with quick frozen foods, including vegetables. She learned that the Admiralty has no deep freezers at Devonport. But, said the Admiralty Parliamentary Secretary, Mr. Charles Orr-Ewing, ships occasionally buy these foods direct from the trade. Inquiries are being carried out to bring a wider range of quick frozen foods for the benefit of the fleet.

Meanwhile, packeted boneless beef has been supplied for many years to smaller ships, where space is at a premium. As a further step the Admiralty has now arranged for supplies of frozen joints of beef without bone, as well as frozen joints of mutton and lamb, to commence for ships this summer.

M.P.s learned of the efforts constantly going on to remind the handlers of food and the general public of the importance of hygiene. The Food Hygiene Regulations, 1955, have had a wide circulation through local authorities and trade associations. Visits, advice and persuasion by local authority officials are supplemented by publicity designed to call attention to the need for food hygiene. There is no complete record of them, but successful prosecutions have taken place for offences against almost every regulation on this subject, it was indicated.

Dr. Edith Summerskill, who was at the Ministry of Food under the Labour Government, questioned the Health Minister, Mr. Derek Walker-Smith, about imported items such as dried egg albumen, frozen liquid eggs, and organic fertilisers, asking if he was satisfied that they were properly inspected. Did he not think, possibly, that more pasteurisation of certain imported foods was necessary " in view of the increased incidence of food poisoning?" But the Minister was satisfied about the inspection, although he offered to look into it if Dr. Summerskill thought it necessary.

There is no evidence that Russian imports of salmon have been subsidised. This was the Board of Trade answer to allegations of undercutting of Canadian and British salmon by similar subsidised Russian products of equivalent grade.

Salmon imports from the Soviet Union have been running at low levels and (up to last month) no request had been made to the Government by the interests concerned to impose countervailing duties on these imports under the Dumping and Subsidies Act.

The Minister of Agriculture, Fisheries and Food, the Rt. Hon. J. H. Hare, examining an instrument for studying the residual respiration of meat muscle tissues during his recent visit to the British Food Manufacturing Industries Research Association.

F.M.A. annual dinner

The annual dinner of the Food Machinery Association was held at the Hyde Park Hotel on May 12. Among the guests was Sir Frank Shires, chairman of the Board of Governors, National College of Food Technology, who, in his reply on behalf of the guests to the speech of welcome made by the chairman, Mr. A. Graham Enock, emphasised industry's responsibility to use every new method of increasing efficiency as it became available, and spoke of the progress made in establishing the National College of Food Technology as an important source of trained people. A presentation was made to Mrs. K. Gwynn Jones, who retired from the post of commercial officer after 18 years' service.

Materials handling lectures

The National Joint Committee on Materials Handling, a body on which are represented over twenty professional and kindred societies concerned with various aspects of materials handling, feels that it may be able to assist secretaries of societies and other bodies drawing up their programmes for the 1959/60 sessions, by suggesting suitable subjects for lectures and possible lecturers. For further information write to the Secretary, National Joint Committee on Materials Handling, 69, Cannon Street, London, E.C.4. Tel.: City 4444.

OBITER DICTA

● I rather wish I had never heard of potatoes.—*Mr. Justice Byrne at Derbyshire Assizes.*

● Kippers for breakfast are as U as can be. Not so kippers for tea.—*Letter in Daily Telegraph.*

● It is said that the proof of the pudding is in the eating, and this applies to clothes as well as puddings.—*Woman's page of a Bristol newspaper.*

● If you like to drink sherry out of a tin mug with your oysters then do so—but it is not the general taste.—*Mr. J. W. Mahoney, general secretary, Wine and Spirit Association of Great Britain.*

● Other general features of the installation are level floors throughout to enable the future use of palate trucks if necessary and for this reason sweeper gaskets have been used on all doors. —*Press Release.*

● I enjoy flamboyant advertising and do not object to my children getting plastic space ships with breakfast cereals provided there is no risk of their consuming the space ships with the cereals. —*Mr. Frederick Willey, M.P.*

● Looking at the exhibits, one's mind is seized by a panic-stricken horror of food—a horror which the chefs must surely have shared, judging by their frenzied attempts to disguise the food as something else. — *Manchester Guardian.*

● The visiting foreign chefs tried a full Devonshire tea with clotted cream and strawberry jam, which they ate steadily and with immense concentration. " Wunderbar " they remarked between mouthfuls. " Sehr interessant."—*Sunday Times.*

● An American dietician had assured her (Lady Lewisham) that if you fed enough white bread to a dog, it would go mad. She recalled the jingle " The whiter the bread, the sooner you are dead." And white sugar, she cried, contained no living vitamins and congealed round the heart.—*Manchester Guardian.*

● It is of great interest to follow the deep digging for the origin of " Let them eat cake." The research has now retreated to the thirteenth century and it can only be a matter of time before, bearing in mind his gallant attempt in the bakehouse, King Alfred is disclosed as the author. —*Letter in The Times.*

Correspondence

" What has happened to your jam ?"

SIR,

May I congratulate you on the courageous ideas put forward in your leading article, particularly since they appear in the pages of a publication which essentially puts forward the point of view of food manufacturers. A generation is growing up quite oblivious of many of the subtle and interesting flavours which meant so much to their forbears.

As a consumer rather than as an analyst I think identically as you do in the case of the jam and marmalade on the market today, *vis-à-vis* the full flavoured products that we enjoyed years ago.

One theory I venture to offer is that the time factor during which fruit pulp is in contact with sulphur dioxide preservative may be important. It is highly probable that the trace ingredients which constitute the actual flavouring principles of the fruit undergo an irreversible change in contact with sulphites, when the old equation that we used for war gases $M=C\times T$ comes into operation. Once the colour of the fruit has been destroyed by the bleaching action of the sulphur dioxide, an approximately similar colour can be substituted later, which serves its purpose as far as the average housewife is concerned, by the addition of a synthetic dye. But once the flavour has gone it has gone for all time and the present generation is eating flavourless second-best without realising it.

It would be a most difficult problem to my mind to put any control on the age of preserved fruit pulp but I am prepared to believe that after a finite time it is so tasteless as no longer to be worth using, and I should say that this is quite a possible explanation of some of the uninteresting jam and marmalade that is on the market at the present time.

The process of deep freeze may similarly be to blame for the lack of flavour in some fruit and meat products.

Yours faithfully,

F. C. BULLOCK,
B.SC., F.R.I.C., P.A.INST.W.E.
City Analyst,
City of Leicester Health Department.

Industry in Scotland

SIR,

Your editorial article in the May 1 issue, " Distribution of Industry," refers to areas where Government assistance may be available to firms under the Distribution of Industry (Industrial Finance) Act, 1958.

The facilities of the Act will certainly be of interest to any concerns contemplating new manufacturing ventures. It is to be regretted, therefore, that your list of areas covered England only, when in fact D.A.T.A.C. assistance under the Act is available in five main regions as well as a number of individual towns in Scotland.

There are already several English food firms manufacturing in Scotland and there will certainly be a warm welcome for as many more as may care to come. The development organisation which I serve exists to encourage *inter alia* the advent of suitable new manufacturing projects to Scotland, and its services—which are free—are readily available on a confidential basis to firms interested in the possibility of locating a manufacturing unit in Scotland.

Yours faithfully,

J. A. DONACHY,
Senior Administrative Officer.
The Scottish Council (Development and Industry).

Ninety readers a copy?

SIR,

While visiting Viscose, Ltd., of South Dock, Swansea, sponge manufacturers, I found in the waiting room a well-thumbed copy of FOOD MANUFACTURE of December, 1955. How many people in industry have read this copy since publication day? This makes an interesting speculation when one hears people making varying claims or statements about the circulation of trade journals.

The history of this one copy of FOOD MANUFACTURE is, I believe, that it was first of all read by a manager of the company in London, then circulated to his key personnel, then despatched to the Swansea works, where after having been read by several executives it was put in the waiting room. Could one estimate that at least 25 people per annum would read it here? On this modest estimate, this one copy of FOOD MANUFACTURE has been read by about 90 people.

Yours faithfully,

CLAUD MORRIS,
Chairman, Llais Llafur Co., Ltd.,
Printers, Ystalyfera, Glam.

Outings to Chorleywood

SIR,

May I remind the organisers of outings for parties of Master Bakers that while we welcome such parties at Chorleywood it is unfortunately necessary to limit their number, to interfere as little as possible with essential work. Would, therefore, those proposing to visit the Research Station this summer communicate with me without delay to arrange a mutually convenient date.

Yours faithfully,

S. T. KILLICK,
Secretary,
British Baking Industries Research Association, Chorleywood, Herts.

Company Profits & Prospects

Fitch Lovell capitalisation

The directors of Fitch Lovell, Ltd., are to raise the sum of £729,562 10s. 0d. the issue of 1 new fully paid B ordinary share of 2s. 6d. for every existing ordinary and B ordinary share held. The final dividend forecast on the doubled ordinary capital for the year ending April 25, 1959 is 7% plus a capital distribution (tax free) of ½%, equivalent to 14% dividend and 1% capital distribution on the present issued ordinary capital.

Henry Simon (Holdings), Ltd.

The directors of Henry Simon (Holdings), Ltd., have recommended a final dividend of 12½% less income tax, making a total of 20% on the 5,140,500 5s. ordinary shares in respect of the year ended December 31, 1958.

Beecham offer

Beecham Group, Ltd.'s offer to acquire for cash the entire share capital of James Pascall, Ltd. has been accepted by the holders of over 90% of the share capital.

Record sales for Crosse and Blackwell

The chairman of Crosse and Blackwell (Holdings), Mr. H. L. Roy Matthews reported that while sales had set up a new group record in 1958, largely due to greater selling expenses the trading profit declined by £283,980 to £1,003,252.

The net profit declined from £521,617 to £511,151

United Glass raise profits and make scrip issue

The group trading profit for the year ended January 3, 1959, amounted to £1,251,455 (£950,962) and net group and holding company profit amounted to £584,608 (£403,300). The proposed final dividend is 8¾%, less income tax, making a total of 12½% (11¼%).

The firm propose to issue to ordinary stockholders, 640,000 ordinary shares of £1 each, out of the 1,000,000 additional ordinary shares which were created at the extraordinary general meeting held on January 28, 1959. Subject to the passing of the necessary resolution at the a.g.m. on May 29, the shares will be issued in the proportion of one additional £1 share credited as fully paid up for every £5 of ordinary stock held at the close of business on May 5, 1959 and allotment letters will be posted on June 2, 1959.

The directors have also decided that as from June 3, 1959, all the issued ordinary stock shall be transferable in units of 5s. instead of £1 as hitherto.

B.F.M.I.R.A. meeting

The 13th annual general meeting of the B.F.M.I.R.A. was held on May 14, at which Prof. A. C. Frazer, M.D., D.SC., F.R.C.P., was re-elected President. In his Presidential address, entitled "Science and the Food Industry," he surveyed the state of food in Britain a century ago and reviewed the progress which has been made since then. He urged members of the food industry who do not appreciate to the full the importance of scientific research to reconsider their attitude. He defined research, both fundamental and applied, and deplored the lack of adequate communication between the food industry and scientists working in similar fields of interest.

The meeting was preceeded by a luncheon at the Hyde Park Hotel, London, at which the principal guest was the Rt. Hon. the Lord Cohen of Birkenhead, M.D., D.SC., LL.D., F.R.C.P., F.S.A.

Ice cream heat treatment

New Ice Cream (Heat Treatment, etc.) Regulations which came into force on May 1, 1959, were made jointly by the Minister of Health and the Minister of Agriculture, Fisheries and Food. The regulations consolidate the existing regulations on the subject, with amendments that take account of recent developments in the trade.

The present provisions as to the heat-treatment, cooling and freezing of ice cream mix will remain in force; but in addition to the present three methods of pasteurisation a process of sterilisation at a higher temperature of not less than 300°F. for 2 seconds will be allowed. Ice cream mix which has been subjected to this last-named process and canned immediately under sterile conditions will be permitted to be kept at ordinary temperatures so long as the can is unopened.

The new regulations will exempt from the heat treatment requirements any ice lolly mixture or water ice mixture, whether containing milk solids or not, that is acid enough to minimise any risk of growth of harmful bacteria (in technical terms, a mixture with a *p*H value of 4·5 or less). Most lolly mixtures are acid enough to come within this category, but some types, *e.g.*, chocolate lollies, will still be subject to the heat treatment requirements.

Israeli Durum wheat

The first consignment of Israeli Durum wheat to be imported to this country arrived in the Port of London recently. It will be used in the manufacture of pasta products, such as macaroni and spaghetti.

The wheat was ordered by Chelsea Flour Mills, Ltd., and Quaker Oats, Ltd., as a trial order.

Luton Meat Market

Dr. Charles Hill, M.P., M.D., officially opened the new meat market at Luton, Smithfield House, which is owned by the Luton Meat Co., on May 25. The new building is claimed to be the most up-to-date of its kind in the country and its layout is such that a quarter of beef may be taken from the abattoir, placed on a hook, hung from one of the company's stainless-steel bodied vehicles and not leave the hook until the meat is carried into the customer's shop. Along one side of the building is the loading bay leading off which are the sales hall (which is shown above), the freezer, offal room and the cuts and products display room, together with the cutting room, control room, and telephone facilities for buyers. The boiler house and plant room are located at the rear of the building and the administration offices are on the first floor.

The sales hall which is refrigerated has double-glazed unit windows and an overhead tracking system which allows easy movement of the meat.

Flour price agreements to end

The National Association of British and Irish Millers and the regional flour milling associations decided not to defend their cases before the Restrictive Practices Court at the end of May. This means that the associations have ended their flour price recommendations system and the deferred rebates system for big buyers of home-milled flour.

The statement says that the flour millers are satisfied that their arrangements were in no way detrimental to their customers or to the public.

Salmon fish cakes

The latest addition to the range of quick frozen products made by Smedley's, Ltd., is salmon fish cakes which are packed in Scotland. The fish cakes, in packets of 6, are already cooked and have only to be heated throughout.

Erections and Extensions

E. Melling, Ltd., bakers, are having extensions built to their Lion Bakery, Bank Street, Farnworth, Lancs.

■

The Co-operative Wholesale Society, Ltd., will shortly erect a soft drinks depot on a site at Queen's Park, Wrexham, N. Wales.

■

Urney Chocolates, Ltd., Tallaght, Co. Dublin, Eire, have purchased the Dromkeen Chocolate Crumb Factory, at Dromkeen, Eire, for a sum of £20,000.

Arthur Holland, toffee manufacturers, are having extensions constructed to their factory in Virginia Street, Southport, Lancs.

■

Alex Ferguson, Ltd., manufacturing confectioners, have opened a factory at East Crosscauseway, Edinburgh, Scotland.

■

May (Hop Merchants), Ltd., Duke Street, London, S.E.1, are having a hop processing station constructed at Bermondsey, London, S.E.16.

Van den Berghs' Control Laboratory

The new control laboratory which was opened recently by Prof. T. P. Hilditch, C.B.E., D.SC.(LOND.), F.R.I.C., F.R.S., at the Stork Margarine Works, Bromborough, represents the first completed stage of a £3½ million 5 year reconstruction plan now under way at the Van den Berghs and Jurgens factory.

The laboratory facilities were formerly sited at two locations within the factory, but this arrangement, in addition to being inconvenient, was incapable of further expansion to meet future needs.

Covering approximately 8,000 sq. ft., the new control laboratory is divided into 15 laboratories and offices, accommodating the staff of 36, four of whom are graduates, under the direction of the chief chemist, Mr. W. L. Wren, B.SC.(LOND.), F.R.I.C.

The bacteriological section is concerned with dairy control, maintenance of high standards of plant cleaning and the regular examination of products at all stages of manufacture to ensure compliance with the high quality standards regarded as normal by the company.

Chemical control has the same objective and covers analysis of raw and intermediate materials and final products.

Layout

The laboratory or, more correctly, group of laboratories, is located on the first floor of the new L-shaped block of buildings.

The short leg of the L accommodates the main raw materials and finished products laboratory, the investigations laboratory, and the balance room. In the long leg are the bacteriological and other smaller laboratories, covering vitamin assay and physical testing, etc., a store room and office/library, etc.

A facility shared by the raw materials and finished products laboratory and the adjacent investigations laboratory is the vented bench space. A bench unit common to the two laboratories, but divided by a glass window, has been provided with two actual fume cupboards in the outside wall. This arrangement considerably simplifies the ventilation problem.

The raw materials and finished products laboratory, which occupies some 2,000 sq. ft., is equipped with Iroko wood topped benches designed to meet the company's requirements regarding cupboard and drawer arrangement, number and positioning of gas and water taps, sinks and reagent bottle shelving.

A special feature of the main laboratory is the provision of a fume hooded bench area, which covers just over a third of the inside wall. This consists of a three-sided unit which houses, together with the fume hooded bench adjacent to the investigations laboratory, all apparatus generating steam or hot air.

Other features are the provision of the constant temperature rooms covering a wide temperature range (0°-50°C.), and controlled humidity. Titration facilities are centrally arranged on a bench designed for this operation.

The balance room is immediately adjacent to the main laboratory and is situated between the investigations and bacteriological laboratories.

The balance benches consist of tiled brick pillars surmounted by vibration pads and the tops are slate slabs. The floor is also specially designed to minimise vibration.

Although smaller than the main chemical laboratory, the bacteriological laboratory occupies just over 1,000 sq. ft. This laboratory has two special features, a high temperature room for accelerated storage work and a tiled drained floor area over which is fitted a vented hood, for installation of the autoclaves.

Situated adjacent to the chemical/physical laboratory, the investigations laboratory is equipped with benching of a similar type to that in the main laboratory. Special equipment, including a gas liquid chromatographic apparatus, is accommodated in this room.

Although, of course, pure research is not conducted in this factory control laboratory, there remains a considerable amount of non-routine work handled by more senior and graduate staff.

(*Top*): **Mr. A. J. C. Hoskyns-Abrahall, chairman of Van den Berghs and Jurgens, presents a silver salver to Professor T. P. Hilditch, C.B.E. F.R.S., in the centre, to mark the opening of the new control laboratory. Also in the picture is Mr. E. Reid, acting assistant general works manager.** (*Bottom*): **A general view of the main raw materials and finished products laboratory.**

Food News Overseas

New Chinese tea factory

A new tea factory with an annual capacity of 5,000 tons of processed black tea is being constructed at Enshih in Western Hupeh province.

Iraqui sugar factory

The Iraqui Government-owned sugar factory in Mosul began production recently. The annual capacity of the factory is said to be 35,000 tons. The Development Board have approved the appointment of Dr. Jerzie, a Polish expert in sugar-beet cultivation.

Low cost milk food for Ceylon?

The Ceylon Government hope to enter into a bulk buying agreement with the New Zealand Milk Marketing Board for the supply of a powdered milk food made to a formula worked out by three prominent Ceylonese physicians. It is said that this would be considerably cheaper than imported proprietary milk foods, of which about Rs. 40 millions worth is imported annually.

It would be distributed by the co-operatives to hospitals, creches and milk feeding centres.

Furore over Italian margarine manufacturing tax

The price of margarine in Italy, already the highest in Europe, may be further raised by a manufacturing tax of 150 lire per kilo. The average selling price last year was 280 lire per kilo. More than half of the margarine sold in Italy last year, 41,000 tons, was produced by Van den Berghs Co. of Italy, a Unilever subsidiary, whose chairman described the tax as "an attempt to eliminate the alleged competition of margarine with other products."

After it was stated that the tax would probably force the Van den Berghs Company of Italy out of business, the employees of all the 35 margarine producing companies in Italy went on strike against the planned government action.

The government spokesman for the bill, Senator Trabucchi, stated that "the foreign company would be seized if it did not pipe down" and the government would close down the plant.

Foreign business circles in Italy have expressed concern at the threat to seize the plant and cannot see how the action could be reconciled with the government's drive to encourage foreign investment.

Korean laver plant

The Korean Reconstruction Bank has decided to release Hwan 70 million (£500,000) to finance the construction of a processing plant for laver, a form of edible marine algæ, designed to process 500,000 bundles annually. Yusoo, on the south coast of Korea, has been named as a possible site.

African diet food

The first food cannery in Africa catering for vegetarians has begun production in Johannesburg, making a range of 14 foods available. These canned vegetable protein foods are all free of cholesterol; they form a balanced diet and substitute for fresh foods.

Specially blended honey and glucose and non-homogenised peanut butter are among the bottled foods.

Swedish fish flour plant

The first full-scale commercial plant for the production of edible fish flour is being built in Sweden and will come into operation this year. This development is said to mark a significant step forward in man's effort to produce a cheap and plentiful supply of animal protein.

In the course of developing the flour the Swedish concern, said to be the largest pharmaceutical manufacturing company in Sweden, has frequently consulted the Food and Agriculture Organisation concerning quality standards, laboratory tests, consumer acceptability, price and other factors. Now that the product is coming into commercial production the company has asked FAO to co-operate in carrying out acceptability tests in some of the under-developed countries.

"We have agreed to do this, and the tests will be carried out by our Nutrition Division under the supervision of Dr. A. G. Van Veen, Chief of the Food Processing and Preparation Branch," stated Dr. Rudolf Kreuzer, Chief, Fishing Processing Section, Fisheries Division, FAO.

The problem so far has been to produce an odourless and tasteless flour which, at the same time, retained its animal protein with a high biological value.

The Swedish concern, which is building the flour factory, claims to have perfected a method for producing such a flour containing 85% animal protein, which compares with about 15% protein content of fish and meat in fresh state. This is one of the highest concentrated protein substances yet produced by man and may mark a major victory in the battle to supply the mass of people in the world with sufficient animal protein in their diet.

The flour is produced in a closed-circuit plant, fresh fish being fed into the plant at one end and the flour being delivered at the other end. Any type of fish can be used, from sharks to sprats. The vast quantities of trash fish which are now delivered to the fishmeal plants and are chiefly used to provide meal for chickens, which, in turn, provide eggs and meat for mankind, will be equally suitable for the production of fish flour.

Venezuelan Nescafé?

Industria Lactea Venezolana C.A. (Indulaca) is to produce *Nescafé* at a factory in Venezuela whose location has not yet been decided.

Antibiotics for fish

For the first time, the Food and Drug Administration of the U.S. has authorised the use of an antibiotic to aid in keeping fresh-caught fish in sound condition. Fresh-caught whole, gutted and headed fish, shelled scallops and unpeeled shrimps may be treated with chlorotetracycline by commercial fishermen. They are expected to use the antibiotic either in the ice surrounding the fish or as a dip.

Emphasis has been laid on the fact that the use of this aid is only a supplement to the normal storage and hygienic requirements.

The order sets out that the maximum amount of antibiotic which may be found on unprocessed seafood is 5 p.p.m.

Nuclear reactor for agriculture

It has been announced at Wageningen, Holland, that a nuclear reactor will be built there for the Institute for the Application of Atomic Energy in Agriculture. It is believed this will be the first such reactor in Europe to be used for agricultural tests.

It is expected to be ready in 1961. Special safety measures will render it possible to carry out research and experiments considered too dangerous in other agricultural research institutions. Mutation improvement and food preservation are to be the main items of the laboratory's research programme. The reactor will be sited in this laboratory, in which great quantities of radio isotopes and intensive radiation sources will be centralised.

Packaging

Aerosol display

Among the exhibits at a recent display of aerosol and pressure packs held at the Packaging Centre recently was the range of aerosol containers made by the John Dale Group. The range consisted of 1 and 2 piece aluminium extruded cans in 6 oz., 2 oz. and 10 c.c. sizes with variable neck diameters.

John Dale say that some idea of the bursting strength of the cans can be gained from the fact that the cans have achieved in some cases a pressure of 800 p.s.i.

A most important part of John Dale's business consists of making cans to order.

Paper cups

Disposable paper cups suitable for a wide range of purposes are now being produced in this country by Lily Cups and Containers (England), Ltd., on an almost fully automatic plant at Liverpool. The new plant is claimed to be the most advanced of its type in Europe.

The cups are made from a material which is said to be odourless and tastefree. The makers say that the cups can cope with products ranging from ice cream and cottage cheese to beverages.

Elizabeth Lazenby soup packs. Those in the top picture are of "Tripolam X.1" made by the Metal Box Co., Ltd., and the tomato soup in the bottom picture is packed in "Cololam" made by Colodense, Ltd.

Included in the range is a cup with an interior plastic coating, called *China-Cote*, which the makers say will stand up to a temperature of 180°F. for 15 min. and has the feel of real china.

Soup packs

A number of soups made by Elizabeth Lazenby and Son, Ltd. are being packed in *Tripolam X.1.*, made and printed by the Plastics Group of the Metal Box Co., Ltd.

Tripolam X.1. is a combination of two plies of aluminium foil with a single web of paper plus an inner, heat-seal coating, together providing a strong, moisture-proof pack. The outer foil is printed with the brand name, the brand image, the name of the soup, directions for making it and full-colour reproduction of the ingredients, all on a blue background.

This picture of cups, made by Lily Cups and Containers, (England), Ltd., shows an 8 oz. cup with foil closure, a 3½ oz. cone cup, an 8 oz. container with reseal closure, a 3½ oz. squat ice cream cup, and a cold drink cup.

The pack is being backed by extensive advertising on T.V. and posters, and in newspapers.

The new tomato soup pack being marketed by the same firm, comprises two printed polythene-coated cellulose film sachets of liquid tomato concentrate, and two printed foil pouches of soup-mix. These are inserted in a bag of *Cololam* (two plies of MSAT 300 *Cellophane* film, laminated with wax, and sandwich printed). The pack is the subject of a pending patent application.

The 6½ × 5 in. *Cololam* bag (by Colodense, Ltd.), is extensively gravure-printed in five colours. The pack carries details of the product, reproductions of tomatoes, maker's name, address and trade mark, and instructions for use. The background is blue.

The stock range of one and two piece extruded aluminium aerosol cans made by oJhn Dale, Ltd., who also make cans to individual specifications.

Sausage meat wrap

The U.S. firm of Union Carbide International Co. say that a major U.S. meat packer is now using their polythene film to package automatically fresh pork sausage meat. The package, containing 1 lb. of sausage meat is said to have met with the approval of both the packer, with lower production costs, and the consumer, who likes the neatly sealed and easily-handled package.

Tape dispenser

A new tape dispenser, the *Tapemaster P.D.L. Mk. 2A*, has been introduced by John Gosheron and Co., Ltd.

According to the makers, the dispenser is ideal for any establishment where mass production packaging methods are in operation. A calibrated dial on the dispenser is used to select the length of tape required. Individual pieces of tape up to 6 in. long are dispensed. The dispensers will take 72 and 144 yd. rolls of cellulose or vinyl self-adhesive tapes and 60 and 120 yd. rolls of creped paper self-adhesive tape up to 2 in. wide.

Pepper container

The Metal Box Co., Ltd., have pointed out that the pepper container mentioned on p. 183 of the April issue was designed and produced by them while the actual decoration of the container was the work of Richard Lonsdale-Hands Associates, Ltd. Metal Box say that the container is suitable for a wide variety of powdered food products.

Trade Marks

ARCTIC BAR.—B780,717. Biscuits (other than biscuits for animals). **Scribbans-Kemp (Bakeries), Ltd.**, North Circular Road, Cricklewood, London, N.W.2.

CHEDDRETTES.—781,993. Biscuits containing cheddar cheese. **H. S. Whiteside and Co., Ltd.**, Parkhouse Works, Parkhouse Street, London, S.E.5.

TREBOR NUTTIES.—782,234. Non-medicated sugar confectionery and chocolate, all containing nuts. **Robertson and Woodcock, Ltd.**, Trebor House, Woodford Green, Essex.

BONANZA.—783,810. Bubble gum, being chewing gum. **Boomerang Confectionery, Ltd.**, Victoria House, London, W.C.1.

ALMOND BLOSSOM.—781,567. All goods included in Class 29. **John F. Renshaw and Co., Ltd.**, Locks Lane, Mitcham, Surrey.

BARBI-CHICK.—782,372. Roast chicken. **Michael Garforthbles**, trading as **Barbi-Chick**, 87, Westbourne Grove, London, W.2.

PRUBRAN.—776,777. Bran preparations for food for human consumption. **Kellogg, Co.**, Porter and Stiles Street, Battle Creek, Michigan, U.S.A.

RICKO.—779,191. Non-medicated confectionery and biscuits (other than biscuits for animals). **Primrose Confectionery Co., Ltd.**, Argyll Avenue, Trading Estate, Slough, Bucks.

KREEMYMINTS.—779,061. Mint-flavoured toffee. **Edward Sharp and Sons, Ltd.**, Kreemy Works, Maidstone, Kent.

SUZY.—781,318. Non-medicated sugar confectionery and sweet biscuits. **Primrose Confectionery Co., Ltd.**, Argyll Avenue, Trading Estate, Slough, Bucks.

HOWZAT.—783,695. Non-medicated sugar confectionery being sweets. **Chix Confectionery Co., Ltd.**, Argyll Avenue, Trading Estate, Slough, Bucks.

KUNZLE - CLOCK.—B782,859. Sugar confectionery and chocolate confectionery, none of them being medicated; and cakes and flour confectionery. **C. Kunzle, Ltd.**, 156, Broad Street, Birmingham, 15.

ELPU.—782,253. All goods included in Class 30. **Foschivoce, Ltd.**, Sorbo Spice Mills, Chaloner Street, Liverpool, 1.

CARACRISP.—783,628. Chocolate and non-medicated confectionery. **John Mackintosh and Sons, Ltd.**, Albion Mills, Halifax, Yorks.

WHAPRO.—785,516. Foodstuffs for animals. **North Dorset Creameries, Ltd.**, "Beta Works," Fowler Road, Hainault, Ilford, Essex.

IMKO.—782,400. All goods included in Class 29. **Isaac Modiano, Brother and Sons, Ltd.**, 5, Lloyds Avenue, London, E.C.3.

WORONORA.—784,727. Fruit, vegetables, meat and meat products (for food), all being canned; and jam, marmalade, fruit preserves and vegetable preserves. **Lakeland Food Industries, Ltd.**, Solway Estate, Maryport, Cumberland.

PLANTA.—784,781. Edible oils and edible fats. **Van Den Berghs and Jurgens, Ltd.**, Unilever House, Blackfriars, London, E.C.4.

ZISS.—780,304. Fresh fruits, fresh vegetables, nuts (fruits) and Christmas trees. **Onofrio John Tornobene**, 234, Pensby Road, Heswall, Chester.

FITTEN.—B782,396. Food for animals and for birds. **Petfoods, Ltd.**, Melton Mowbray, Leics.

EWEMAX.—784,460. Foodstuffs for ewes. **Scottish Agricultural Industries, Ltd.**, 39, Palmerston Place, Edinburgh, 12.

MADHVANI.—B783,775. All goods included in Class 29. **Madhvaninagar Sugar Works, Ltd.**, Plot No. 25, Main Street, Jinja, Uganda.

BEBONA.—783,369. All goods included in Class 29. **The Nestlé Co., Ltd.**, Hayes, Middlesex.

Technical Press Review

June

Dairy Engineering.—Bulk Handling in Scotland; Education for Dairy Management; American Studies for Dairy Management; The Literature of Dairying; Dairy Engineering Developments in Eastern Europe—2.

World Crops.—Water Supply and Irrigation: Man-Made Rain; Money from Muck; Water for Irrigation; The Cultivation of Citrus—2.

Manufacturing Chemist.—Rubber and Plastics in Chemical Plant: Hard Gelatin Capsule—How Eli Lilly make 500 Million a Year; The Glycols—1; Vetivert Oil from Reunion; Perfumes for Cosmetics—Deodorants and Antiperspirants; Rubber and Plastics in Chemical Plant; Progress Reports: Therapeutics; Detergents and Detergency.

Atomic World.—The Impact of Atomic Energy on Analytical Chemistry; Radiation and Agriculture; Reactors for Schools; Radiochemical Analysis for Non-Active Gases; Nuclear Energy in Norway; Chapelcross Nuclear Power Station Opening Supplement.

Chemical and Process Engineering.—Plant Design Considerations in Effluent Treatment; Treatment of Wastes in the Chemical and Allied Industries; Automatic Control of Effluent Neutralisation; *p*H Neutralisation Plant for Trade Effluents; British Tunnel Driers at French Butyl Rubber Plant; Fractional Distillation — 2; Illustrated Review of the Corrosion Exhibition.

Paint Manufacture. — Oil and Colour Chemists' Association Biennial Conference; Review of Plant and Equipment; Colloid Mills for Paint Manufacture; Mechanical Handling Can Cut Costs.

Petroleum.—Russian Experiences in Gasoline Processing; Electronic Instrumentation at Regent's Port Credit Refinery; Engineering Computer Control Systems; Pipeline Control Systems; Instrumentation in the Petroleum Industry.

For specimen copies write to Leonard Hill House, Eden Street, London, N.W.1.

New Companies

Beacham and Son, Ltd. (620290.) To carry on the bus. of mnfrs. and importers of and dlrs. in foodstuffs, including corn, grain, seeds, etc. £1,000. Subs.: Wm. J. Sellwood, "Downlands," Stoford, Wishford, nr. Salisbury, and A. S. Wickham.

C. H. Bedwell, Ltd. (624059.) 41, Robertson Street, Hastings. Bakers, confectioners, etc. £1,000. Dirs.: Cyril H. and Mrs. Joyce E. Bedwell.

C.Y.B. Fats, Ltd. (624697.) Burke House, 37-8, Gerrard Street, London, W.1. Collectors, mnfrs., extractors, melters, refiners, blenders and importers of and dlrs. in fats, etc. £100. Subs.: Myrna F. Nathan and Audrey Taylor.

T. Fahy, Ltd. (621969.) 156, Banks Road, West Kirby, Ches. Bakers, confectioners and pastrycooks, etc. £10,000. Dirs.: Thomas, Mary and Anne Fahy, and John S. Newby.

John Ferretti, Ltd. (621510.) 3-5, Chorley New Road, Norwich. Mnfrs. of and dlrs. in ice cream and ice confections, toffee, candy, chocolate, etc. £5,000. Permt. dirs.: Giovanni and Mrs. Winifred Ferretti.

E. J. Gane and Sons, Ltd. (621613.) Corporation Road, Newport, Mon. Mnfrs. of and dlrs. in sausages, brawn, potted meats, meat substitutes, etc. £3,000. Dirs.: E. J. and Mrs. Enid Gane.

Gattafarn, Ltd. (621806.) To carry on the bus. of mnfrs. of and dlrs. in foods, drinks, sweets, confectionery, etc. £100. Subs.: Jean and Thomas A. Herbert, 156, Strand, London, W.C.2.

J. Lowe and Co. (Processed Foods), Ltd. (621496.) 1, Richard Street, Manchester, 10. To take over the bus. of "John Lowe" carried on at Miles Platting, Manchester, 10, and to carry on the bus. of bottlers of and dlrs. in bottled fruits and vegetables, etc. Dirs.: John and Mrs. Hilda Lowe.

H. Polak and Co., Ltd. (622456.) To carry on the bus. of meat salesmen, commission agent, dlrs. in and mnfrs. of fats, casings and offals, etc. £10,000. Permt. dirs.: Harris Polak, 54, Dunbabin Road, Liverpool, 16, and Samuel Polak.

Southern Hemisphere Casings, Ltd. (621967.) To carry on the bus. of agents, brokers, factors, dlrs. in and mnfrs. of sausage casings, etc. £10,000. Subs.: H. H. Marcus and P. C. Willoughby, 27, Ely Place, London, E.C.1.

Swiss Patisserie, Ltd. (621242.) 2, Bentinck Street, London, W.1. Biscuit mnfrs., bakers, etc. £1,000. Dirs.: Emil L. and Amanda Meier.

Tastee-Freez, Ltd. (622376.) To acquire patents etc.; to carry on the bus. of providing advice and technical assistance and other services in connection with the production and marketing of foodstuffs, etc. £100. Subs.: S. E. Q. Henriques and Allan T. Bruce, 199, Piccadilly, London, W.1.

Unigate, Ltd. (621482.) To acquire all or any of the shares and stock of United Dairies, Ltd., Cow and Gate, Ltd., and Aplin and Barrett, Ltd. £100. Subs.: Kenneth Cole, Barrington House, London, E.C.2, and C. G. Porter.

These particulars of new companies recently registered have been extracted from the daily register of Jordan and Sons, Ltd., Company Registration Agents, 116, Chancery Lane, London, W.C.2.

Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

813,341. MACHONOCHIES' KIPPERS, LTD.: Packaging and distribution of fish.
813,361. NOPCO CHEMICAL CO.: Poultry feeds.
813,394. NATIONAL CYLINDER GAS CO., LTD.: Method of extracting sugar from sugar cane.
813,402. E. F. DREW: Vegetable fat, particularly for a margarine composition.
813,434. UNILEVER, LTD.: Separation of protein from protein-containing material.
813,500. DUINTJER WILKENS MEIHUIZEN AND CO., N.V.: Preparation of gelatinised starches.
813,717. NATIONAL DAIRY PRODUCTS CORPORATION: Confection and method for producing same.
813,725. MONKHOUSE AND GLASSCOCK, LTD.: Pudding compositions.

ABSTRACTS OF BRITISH PATENTS

Cocoa powder manufacture

The object of the present invention is to make a cocoa powder of the darkest possible colour in an economical manner. The cocoa powder is exposed, before drying, to a steam and oxygen-containing gas at the same time as it is being mechanically disintegrated. The steam-gas treatment should last for 25-60 min. at a temperature between 50° and 90°C. During this treatment the cocoa powder absorbs moisture and becomes very dark due to a chemical condensation of the colouring particles. The powder is then conditioned for a period of time before drying at 65°-75°F.

The drying temperature and the absorption of moisture depend on the desired swelling capacity of the finished cocoa powder.—809,216. *Miag Muehlenbau und Industrie G.m.b.H.* (*Western Germany*).

Fermented milk product

The objects of this invention are to improve the process of making a fermented milk product with live lactobacilli and to produce a product resembling yoghurt and yet which has a fresh fruit flavour.

The invention is illustrated by an example in which 10 g. of live culture, in which *Saccharomyces fragilis* and *Lactobacillus bulgaricus* have been developed, is added to 1 kg. of skimmed milk. The mixture is then fermented at 30°-35°C. for 12-24 hr. When the titration acidity denotes 1·6% as lactic acid and the alcohol density reaches 0·4%, the end point of fermentation is reached and 140 g. of sucrose, 4·4 g. of methyl cellulose and 120 g. of concentrated orange juice (concentrated to $\frac{1}{5}$ of original liquid) are added and mixed in.

Calcium carbonate is added and the mixture adjusted to a *p*H of 5·0-5·5, 120 g. of skim milk is added and the whole pasteurised by flash heating to 75°C. and cooling rapidly. The mixture is then inoculated with 40 g. of a culture containing cultivated *Lactobacillus bulgaricus*, poured into small containers and fermented at 37°C. for about 5 hr. When the titration acidity has reached 0·5-0·7% as lactic acid and the content has curdled like jelly, the finished product is stored in a refrigerator.—809,598. *Kaiun Mishima* (*Japan*).

Liquid shortening

This invention provides a liquid shortening, pourable at normal temperatures, which can be used for normal baking purposes and which gives similar results to those obtained with normal plastic shortenings.

The opaque to translucent liquid shortening has a liquid glyceride vehicle in which is suspended 2-10% of finely divided solid material which includes 1-2·5% by weight of the shortening of a solid "high ratio" emulsifier. The balance of the solid material consists of saturated glycerides (80% of which are in the form of *beta*-phase crystals). The solids content of the shortening has been increased by not more than 20% of the solids content at 100°C. when the shortening is cooled to 60°C., the shortening being pourable at a temperature of 60°C.—810,277. *Thomas Hedley and Co., Ltd.*

Treating protein meal

A process is described for after-treating high protein feedstuff meals of marine animal origin, such as herring meal, to condition the meals for storage and, at the same time, to enable a more uniform product to be obtained. The meal is stored in a bin and a stream of gas is passed through the bin from the bottom to the top. The temperature of the gas should be between 35° and 60°C. and have a moisture content sufficient to prevent the drying out of the meal. The stream of gas, which may contain a substantial amount of air, may be supplied in a non-uniform manner so that the meal is set in motion and thorough treatment takes place. An apparatus for carrying out the idea is also described.—810,680. *A. J. S. Marstrand* (*Norway*).

Linked sausage machine

The present invention concerns a machine for producing chains of linked sausages.

The apparatus has two or more members situated along an axis with one or more of the members capable of rotating about the axis, thereby allowing relative rotation between any two or more members. Means are provided for rotating the movable members, and the arrangement is such that when two lengths of stuffed sausage casing are inside the members substantially parallel to the axis and side by side and the members are rotated, then the lengths of sausage casing are twisted about each other to form a chain of linked sausages. Each link of the chain consists of two sausages which were accommodated inside one of the members.

The specification is illustrated by two sheets of drawings.—809,532. *T. Wall and Sons, Ltd.*

Applying breadcrumbs

It is stated that difficulty has been experienced in coating with breadcrumbs the undersides of fish sticks, fillets, scallops and other foodstuffs previously dipped in a paste or batter when the crumbs have been fed from a hopper sited over a conveyor belt. The improved apparatus described has a supporting plate arranged close below the upper run of the wire mesh belt to support a layer of crumbs and a guiding plate arranged close below the lower run of the belt and continuing around a substantial portion of the forward roller of the belt to guide a supply of crumbs from the guiding plate towards the upper run of the belt.

The guiding plate extends along substantially the whole length of the lower lap of the belt, while the supporting plate falls short of the end of the guiding plate (in the direction of movement of the belt) to allow the surplus crumbs to fall from the end of the supporting plate on to the guiding plate. The lower run of the belt then serves to feed the crumbs along the guiding plate back to the upper run of the belt.

The layer of crumbs provided for the articles is said to minimise marking of the articles by the wires as well as providing adequate coating.—810,559. *Rose Brothers* (*Gainsborough*), *Ltd.*

Notes for Contributors and Authors

The Editor of FOOD MANUFACTURE welcomes articles, news items and other contributions on all aspects of food production.

The purpose of this journal is to exchange information between all those concerned in the food industry. Articles should therefore be written in a readable style, avoiding esoteric terminology and technical jargon, and should contain factual and practical information.

A preliminary synopsis should, preferably, be sent to the Editor, and the contribution itself should be typed in double spacing on one side of the paper only. It should bear the name and address of the author and should be accompanied by photographs suitable for illustrations.

New patents are from the Journal of Patents and new trade marks are from the Trade Marks Journal. In each case permission to publish has been given by the Controller of Her Majesty's Stationery Office. Each of the publications is obtainable from the Patents Office, 25, Southampton Buildings, London, W.C.2.

Number 10 June 1959

Refining Edible Oils

LODERS and NUCOLINE LTD.

INFORMATION BULLETIN

This advertisement is one of a series of Information Bulletins issued by Loders & Nucoline Ltd. Copies are available, together with a folder, on request to Loders & Nucoline Ltd., Unilever House, London, E.C.4.

CRUDE OILS

THE crude oils obtained by expelling or solvent extraction contain three undesirable classes of substance which have to be removed before the oils are suitable for human consumption. These are free fatty acids, colouring matter and substances giving rise to unpleasant tastes and odours. The refining processes used to remove or reduce these are known respectively as *Neutralising*, *Bleaching* and *Deodorising*.

A Modern Edible Oil Refinery

NEUTRALISING

The crude oil is heated in a vessel known as a Neutraliser, and a pre-determined quantity of a solution of alkali in water is sprayed on to it. The mass of oil is stirred long enough to allow the alkali solution to react with the free fatty acids which are present, thus forming a solution of soap and water. This solution, which sinks to the bottom of the vessel, is run off and later transferred to a soap-splitting plant where the fatty matter is recovered as a by-product of the main refining operation. This is the acid oil of commerce.

To make sure that all traces of soap are removed from the neutral oil, it is washed several times with hot water. The contents of the Neutraliser are allowed to settle and the water and any emulsion formed is run off.

BLEACHING

At this stage of treatment, the free fatty acids and a proportion of the colouring matter have been removed, but still further treatment is necessary to bring the oil to a satisfactory colour. It is therefore bleached by bringing the oil into intimate contact with certain solids which have a strong absorbing affinity for the colouring matters. The materials usually used for this purpose are fuller's earth, activated earth and carbons.

After the neutral oil in the Neutraliser has been dried by heating under vacuum, the temperature of the oil is reduced and the bleaching earth, in the form of a powder, is sucked into it and the vacuum is then broken. The oil and bleaching earth are stirred. When this stage is complete, the oil is pumped through filter presses which remove completely all traces of the earth, and the oil emerges bright, clear and of a pale colour.

DEODORISING

The substances responsible for the characteristic taste and smell of the oil are only present in small amounts, but it is necessary to remove them if the finished oil is to be completely bland and odourless. Their removal is brought about by passing steam through the oil, which is kept at suitably high temperatures and under very high vacuum, the substances being carried away by the steam. After three to seven hours of this treatment which is known as deodorising, the oil is cooled and it is then tasteless, odourless and crystal clear, ready for delivery.

LN 53-8058

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As approved in the United Kingdom by "The Antioxidant in Food Regulations, 1958"

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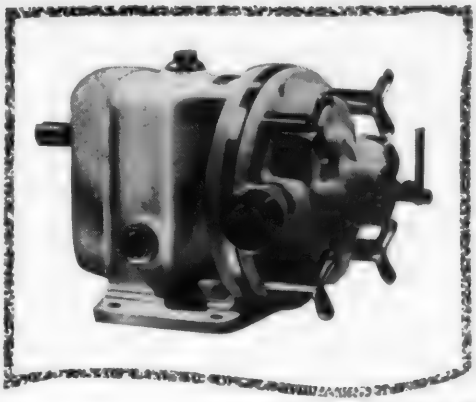

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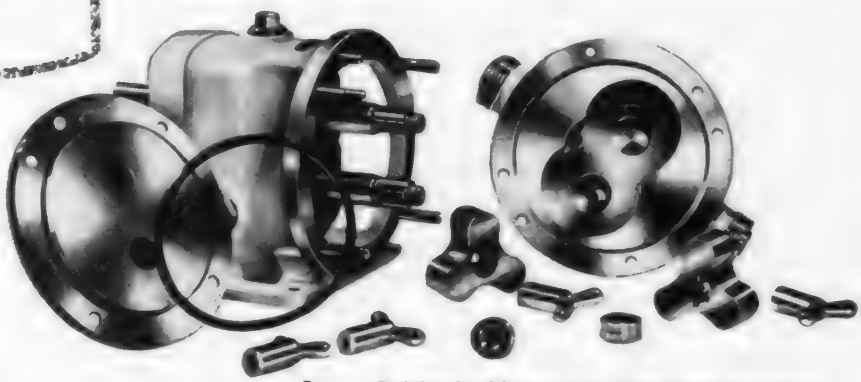

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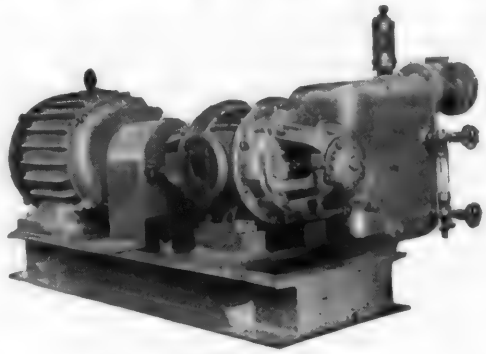

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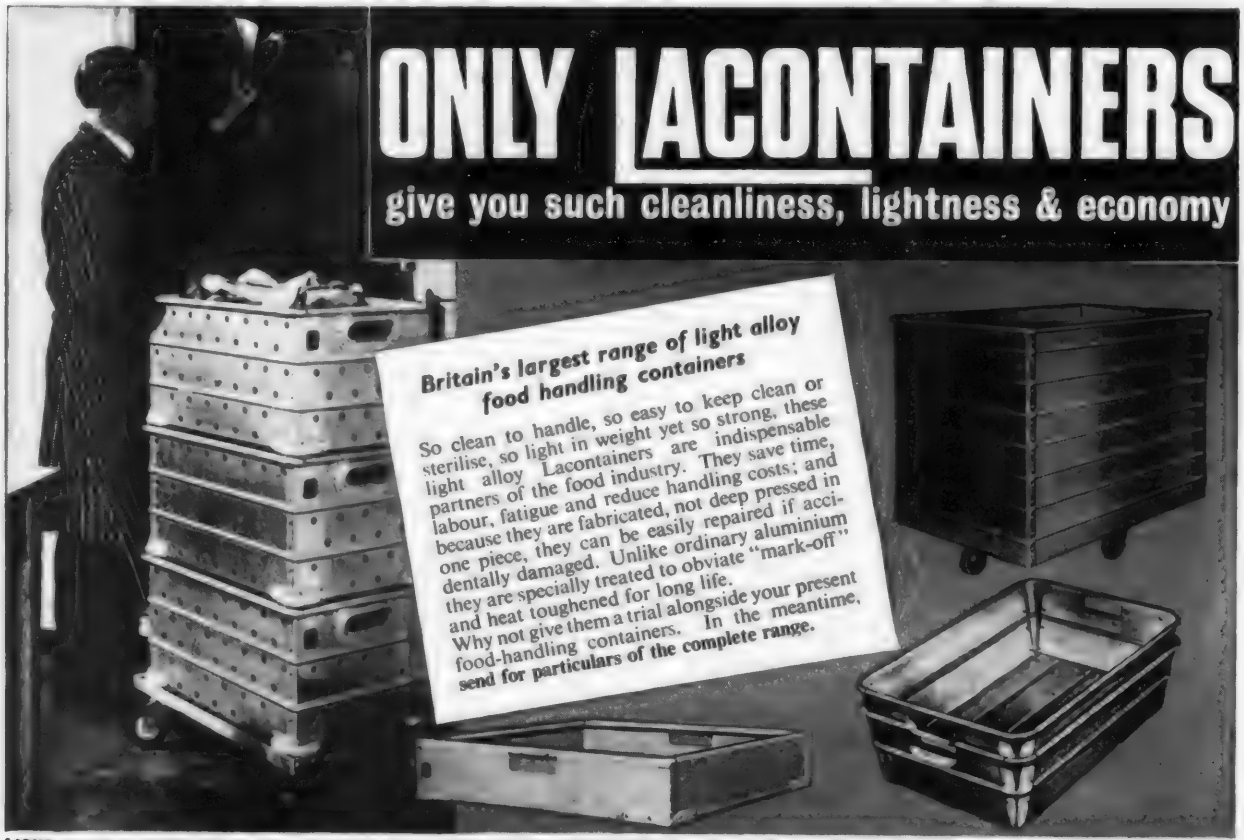
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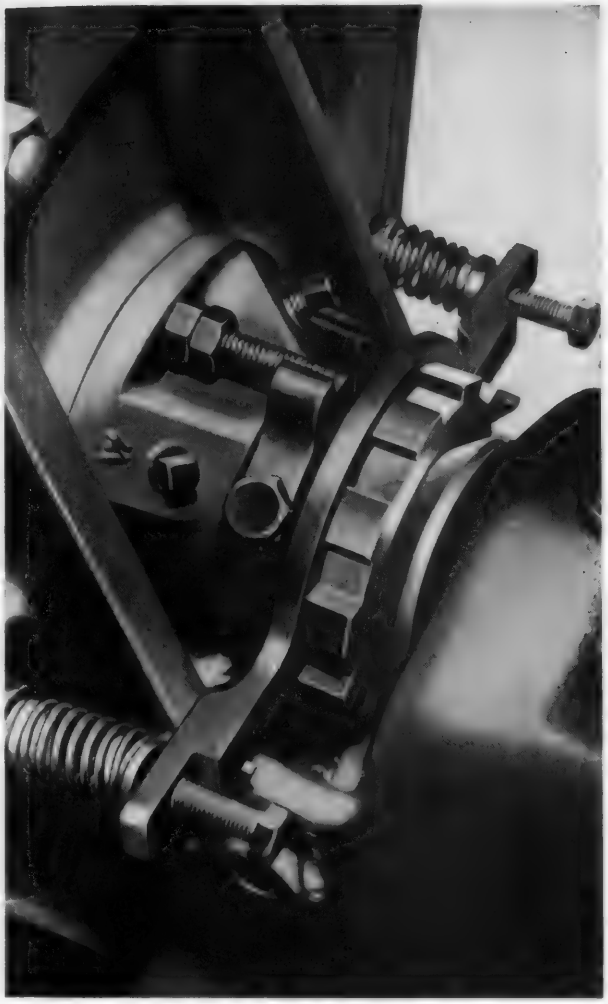

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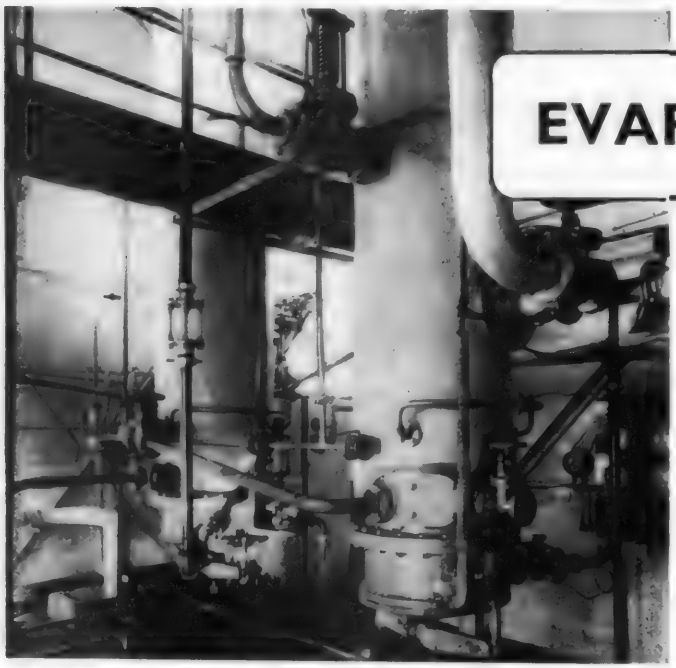

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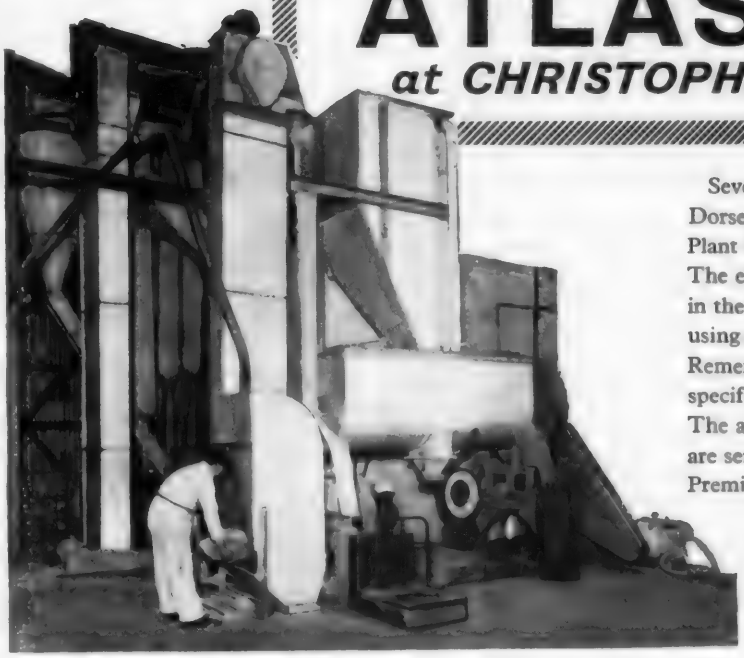

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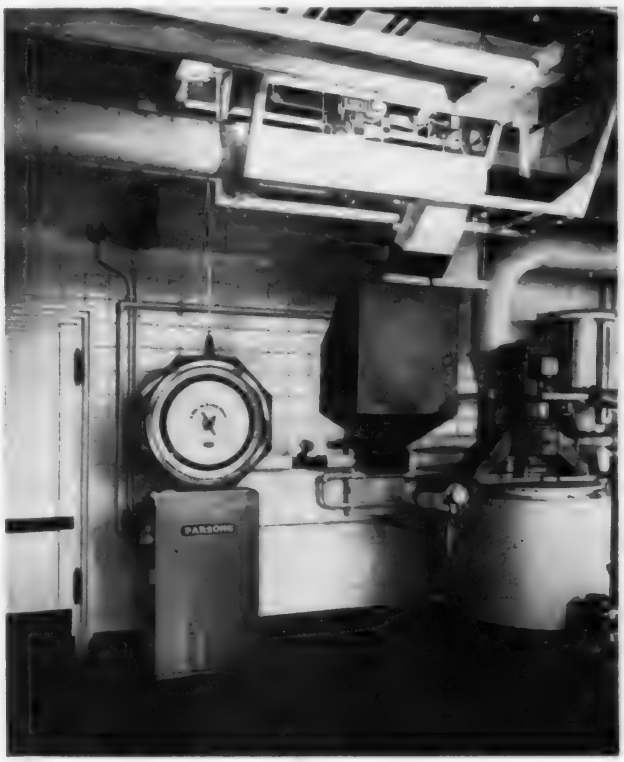

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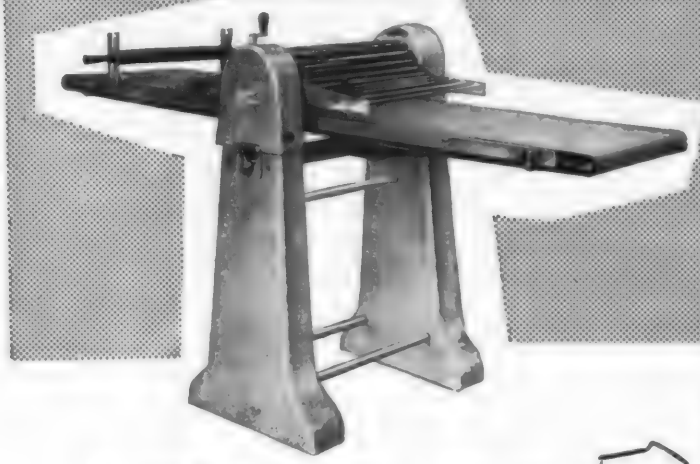

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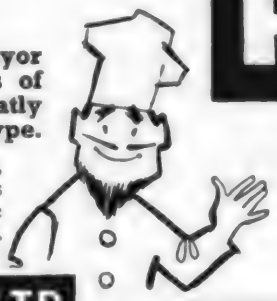

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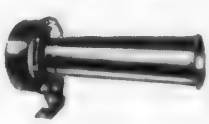

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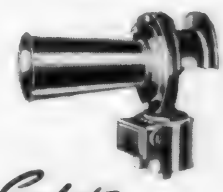

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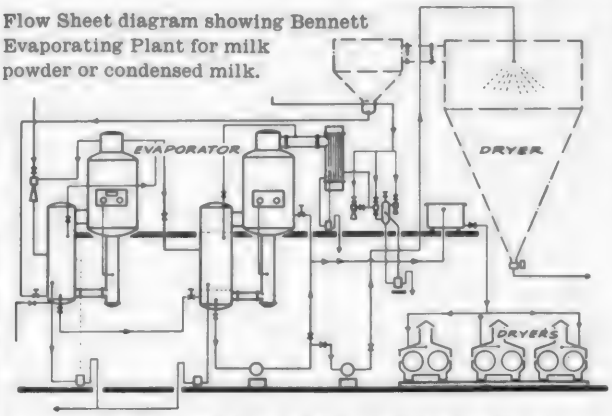

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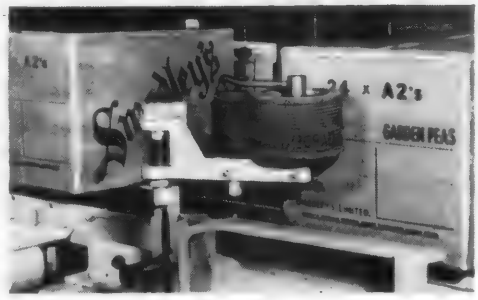

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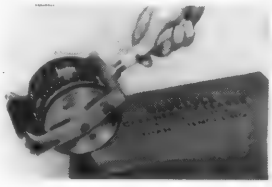

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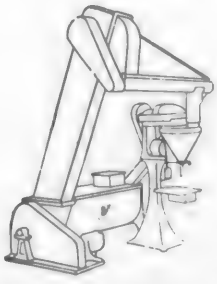

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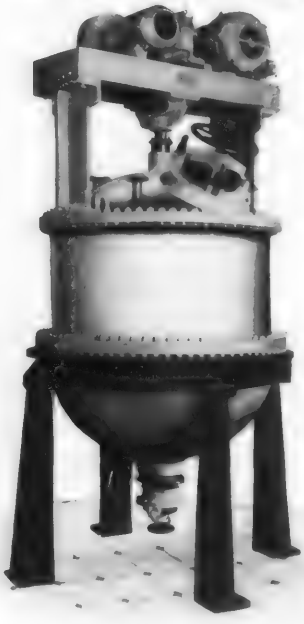

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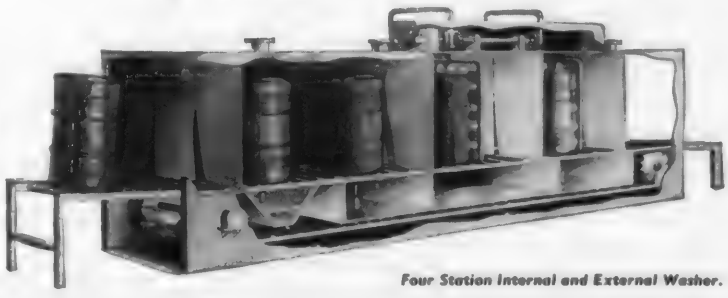

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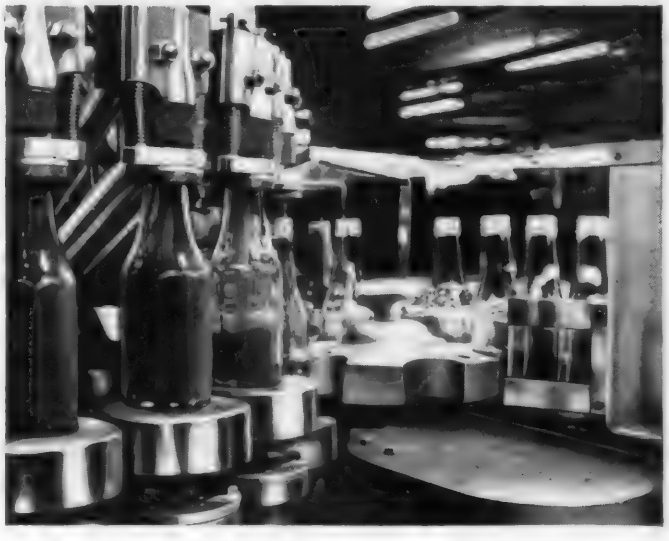

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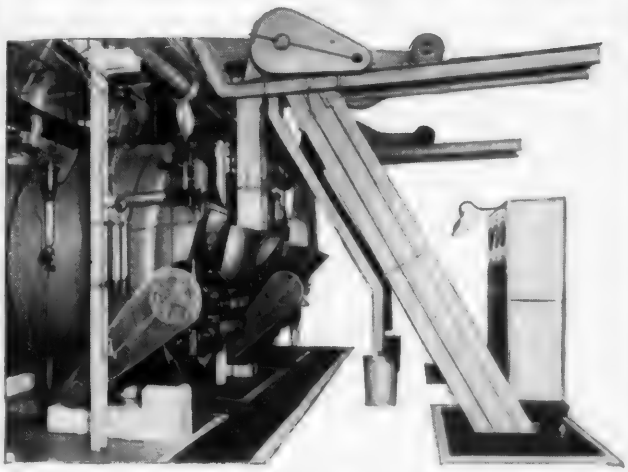

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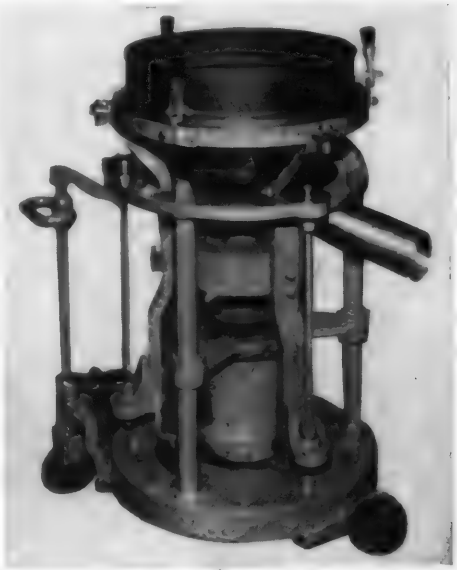

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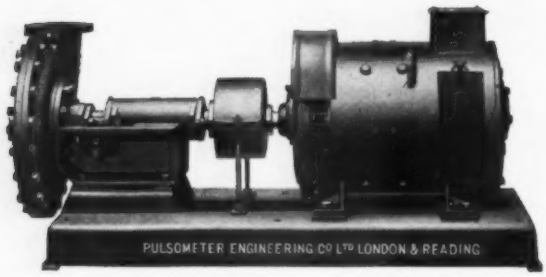

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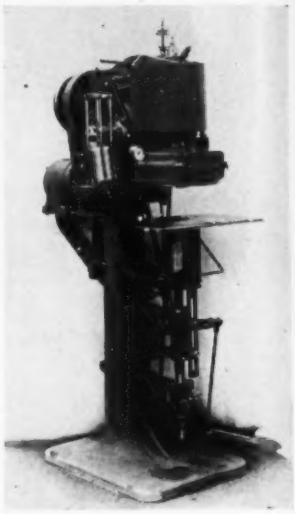

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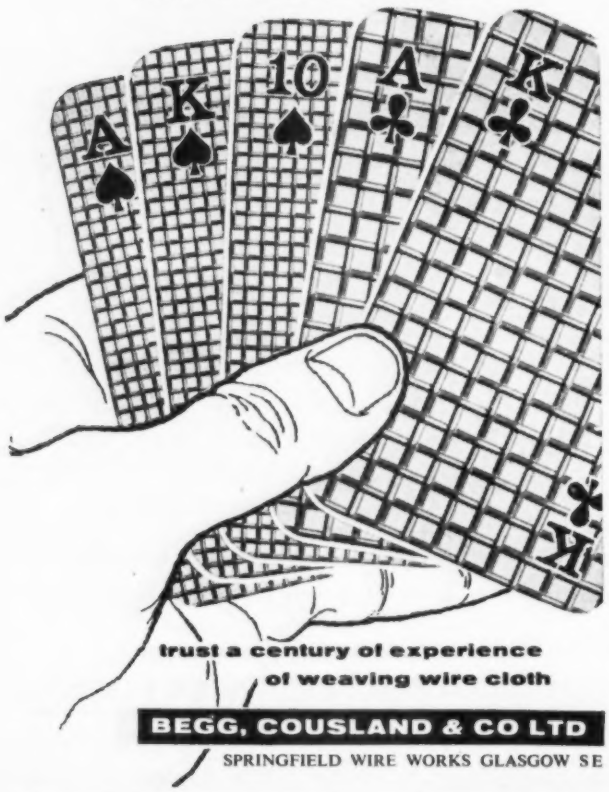

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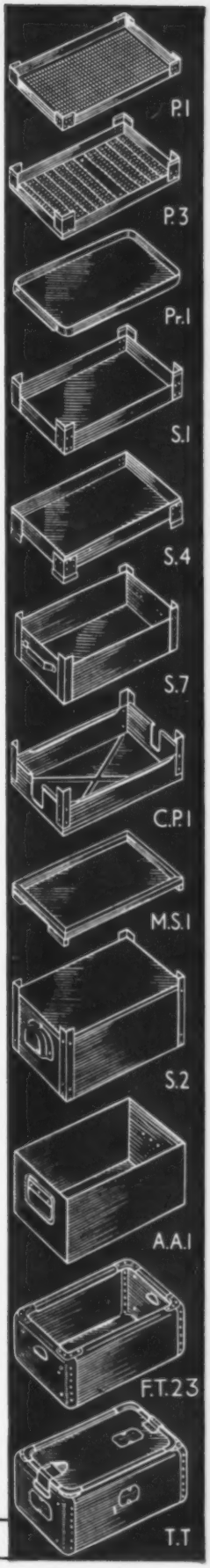

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